

THE EFFECT OF TUBERCULOSIS
ON THE INDIANS OF SASKATCHEWAN:

1926 - 1965

A Thesis

Submitted to the College of Graduate Studies and Research

In Partial Fulfillment of the Requirement

For the Degree of Master of Arts

In the

Department of Anthropology and Archaeology

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ABSTRACT

This research explored several adaptations to tuberculosis among the Indian population of Saskatchewan from 1926 to 1965 in order to demonstrate that this was an era in which disease played an significant role in the lives of the Indians. A broad ecological model allowed for a variety of interactions to be explored. Within this framework, the study examined: the epidemiology and ecology of tuberculosis in the Saskatchewan Indian population; the development of health services to the Indians and the role of health services in the ecology of disease in this population; and the individual Indians' hospitalization and tuberculosis experience.

The epidemic of tuberculosis among the Indians of Saskatchewan began in the early 1880s. Rapidly assuming epidemic proportions, the death rate from tuberculosis among the Qu'Appelle Indians peaked in 1886 at a rate of 9,000 per 100,000. The death rate declined gradually after 1890 through the acquisition of population resistance and the elimination of the non-resistant families. The acute phase of the tuberculosis epidemic, characterized by extra-pulmonary disease in which the majority of cases terminated in a few months, lasted about two decades. Between 1907 and 1926, with gradually improving living conditions, continued acquisition of population resistance, but without application of any specific anti-tuberculosis measures, the death rate fell to 800 per 100,000.

Tuberculosis was endemic in the Saskatchewan Indian population by the beginning of the 1930s. Once endemic, the decline of the tuberculosis death rate continued to the end of the 1940s, without application of any specific anti-tuberculosis measures. By the time that specific measures were introduced, the death rate had declined to 417 per 100,000 in 1949. With the introduction of BCG vaccination and anti-microbial drug treatment, by 1959 the death rate declined to 39 per 100,000.

By the early 1960s tuberculosis mortality was successfully controlled in Saskatchewan, although death rates remained 15 times higher among the Indians. Tuberculosis morbidity continued to be a problem into the 1980s. In 1984, the incidence of tuberculosis was 21 times greater among the Indians than the corresponding rate in the non-Indian population.

Various environmental and cultural factors contributed to the Indian population's experiences with tuberculosis. The most important factor was the absence of population immunity. In addition, concentration of the population on reserves, the occurrence of intercurrent epidemics, sudden and dramatic dietary change, and lifestyle factors such as housing, sanitation and personal hygiene all contributed to incredibly high tuberculosis mortality in this population. The effect of medical care on the epidemiology of tuberculosis in the Saskatchewan Indians was not even considered in the preliminary analysis of the epidemic, because throughout the first several decades of the epidemic, no organized health services existed for the Indians.

In Saskatchewan, before World War II, medical services to the Indians were characterized by occasional surveys, the employment of part-time physicians, and health education through the distribution of circulars to Indian agents on health-related issues. Organized anti-tuberculosis programs which were developed in the years following the Second World War, in a large part, account for the dramatic decrease in the tuberculosis death rate in the province through the decade of the 1950s.

In the late 1940s, and throughout the 1950s and 1960s, most active Indian tuberculosis cases diagnosed in Saskatchewan were hospitalized for treatment. At least 10% of the Indian population of Saskatchewan received Indian hospital or sanatorium treatment throughout the first decade that those services were available to them.

Interviews conducted with fourteen Indian individuals who had been hospitalized for tuberculosis treatment provided two dichotomous perspectives on tuberculosis. Several individuals feared tuberculosis because of their familiarity with it in their families

and on their reserves, however, most said that they knew tuberculosis, but they did not fear it. In terms of their knowledge about tuberculosis from a biomedical perspective, most had some idea of its symptomology although its specific etiology was not known. Most of the people interviewed appeared to understand the infectious nature of tuberculosis, however, their concern for their families may have stemmed from observations that tuberculosis was "in" particular families, not necessarily because they thought they could "give" tuberculosis to them. In terms of a perspective on the treatment of tuberculosis, most of the individuals interviewed were aware that hospital treatment was necessary. Archival sources and government annual reports, indicated that many Indians took a very active role in attending to their health needs. None of the individuals who were interviewed refused to go to the sanatorium, except for one woman who ran away several times. Most, however, planned their escape time after time. This suggests that their stay in the sanatorium and hospital may not have been of their own volition.

The most common and recurring theme that emerged from the interviews about life in the sanatoria or Indian hospital revolved around the structured, regimented nature of the treatment. Several individuals remembered quite vividly seeing other patients confined in strait-jackets and body casts and distinctly remembered how strict the staff was with children.

While they were hospitalized, all of the individuals who were interviewed knew several other people who were being treated at the same time who were also their contemporaries from their own or surrounding reserves. All of the individuals also made several lasting friendships with people that they met while in the sanatorium. In addition, all, except for one young boy, were visited frequently by their families and friends. This indicates that the Indian people interviewed were not "isolated" from their families and friends for the duration of their treatment. Hospitalization, for those interviewed, was not a traumatic event because they had an extensive social network which enabled them

to cope with the experience. In addition, because of the poor living conditions on many Indian reserves, a trip to the sanatorium or Indian hospital was a relief for some. Indian children in the sanatorium and hospital were given new clothes, toys, and books, and in some cases an education; things they did not get at home. One woman chose to remain in the sanatorium after her treatment regimen ended so that she could complete her education, something she could not do back at home in the north. Only one individual suggested that the experience was instrumental in determining the direction his future took.

In demonstrating that this was an era in which disease played a major role in the lives of the Indians, the epidemiology of tuberculosis in this population illustrated the pervasive influence that tuberculosis had on demographic and biological aspects of the population. The history of health services illustrated the role of medical intervention in the ecology of tuberculosis in this population. As a probe for behavioural adaptations to disease on the individual level, the interviews contributed a human dimension to the study. To complete the picture of the role of disease in the lives of the Indians, the examination of the final component in adaptation, behavioural adaptation to disease at the cultural level, is recommended.

ACKNOWLEDGEMENTS

I would like to first acknowledge the support of the College of Graduate Studies and Research, and the College of Arts and Sciences (Hantelman Humanities fellowship) whose financial assistance have made this research possible.

A great number of individuals played a key role in this project. For their encouragement and guidance I would like to first thank the members of my thesis committee: Dr. A. M. (Sandy) Ervin (Advisor) and Dr. E. G. Walker, Department of Anthropology and Archaeology, and Dr. J. Waldram, Department of Native Studies, University of Saskatchewan. In addition, I would like to thank Drs. Ervin and Walker who, long before I came along, developed the initial idea for this research and collected much of the preliminary data.

I would also like to recognize all of the people that were consulted throughout the course of the research. Much thanks to the staff of the Anti-Tuberculosis League, past and present; to the faculty and staff of the Department of Community Health and Epidemiology for their confidence in me and for their enduring support; and to the late Dr. S. Stead for passing on to his students his passion for things epidemiological.

Most importantly I would like to thank all of the individuals that I interviewed who let me into their homes and shared a piece of their lives with me; and I would like to thank Violet who gave so much of her time and of herself, on more than one occasion, to taking me around interviewing people and answering my unending stream of questions.

Finally I would like to thank my husband, my family, and all of my friends for their encouragement, their faith in me, and their extraordinary patience. Without their support this project would not have been possible.

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1. INTRODUCTION

1.1 Purpose and objectives

The goal of this research is to examine tuberculosis among the Indians of Saskatchewan within an ecological frame of reference. The temporal limits of the study are 1926 to 1965. This period represents an era in which disease, particularly tuberculosis, played a major role in the lives of the Indians. This period also represents an era in which the tuberculosis experience in this population has not been studied. The only comprehensive study to date on tuberculosis in this population, dealt with the period from the beginning of the tuberculosis epidemic in the 1880s to 1926 (Ferguson, 1928). When the Saskatchewan Anti-Tuberculosis League took over tuberculosis care delivery responsibility for the Saskatchewan Registered Indian population in 1965, separate Indian/non-Indian statistics indicated that although tuberculosis was no longer a leading cause of death among the Indians, it continued to be a major health problem. Several studies of Indian tuberculosis date from after this time. The present study therefore examines tuberculosis in the Saskatchewan Indian population from 1926, where Ferguson (1928) left off,¹ to 1965, after which time the continuing tuberculosis problem has been delineated in the literature.

The ecological model used in this research is composed of three subsystems: the physical environment, the social environment and the individual. The local level of the environment is recognized to be a part of a larger macro environment. The local environment includes all of the factors external to the individual that may affect it in any way including physical factors of climate and geography. It also comprises organic factors including disease causing organisms. To facilitate analysis, the human (social)

¹ In addition, prior to the late 1920s, mortality data in general are unreliable, and reporting for the Registered Indian population more so.

environment is articulated in the model as a unique subsystem composed of human biological, demographic and cultural characteristics. The individual component of the model is the level at which disease is manifested. Individual biological and cultural characteristics may represent challenges to an individual's health or they may be resources that an individual can draw on. Analysis of the interaction of variables within this model delineates the multi-factoral nature of the health/sickness process.

The use of a broad ecological model in examining tuberculosis allows a variety of interactions to be studied. Within this framework, the present study examines three components. The study first examines the epidemiology and ecology of tuberculosis in the Indian population of Saskatchewan in its historical context. Second, the study examines the epidemiology of tuberculosis in relation to the provision of health services to this population. Finally, to attain an additional perspective allowed for in the model, though not usually a component of ecological studies in medical anthropology, the study probes the individual Indians' viewpoint on tuberculosis and the hospitalization experience.

The relevance of analyzing these components and interactions within an ecological framework was demonstrated through a search of the medical-ecological literature. The literature indicated that reconstructing the epidemiology and eliciting the ecology of diseases in anthropological populations is an important first task for medical anthropology. Besides the pioneering work of Ferguson (1928) very little about the epidemiology and ecology of tuberculosis in the Saskatchewan Indian population is known. In addition, studies of tuberculosis in other Native North American populations tend to focus exclusively on the statistics dealing with disease occurrence and mortality. Campbell (1989) suggests that delineating the mortality experience of diseases should not be an end in itself; the compiled data should also be applied in a theoretical context to

understand epidemiological and societal adaptations. The present study attempts to take the statistical data this additional step through analysis of two additional components in the ecology of health in this population.

Examination of the relationship between health services and the health status of the Saskatchewan Indian population was undertaken in response to several indications in the current literature that an increase in health care services may not necessarily be reflected in an improved health status of the people receiving those services.

Young (1988) indicates that for the Indians in the Sioux Lookout Zone, historically there has been no correlation between the health services available to the population and their health status. For the Saskatchewan Indians, throughout the first several decades of the tuberculosis epidemic, no organized health services existed. Tuberculosis was abating on its own without any effective medical intervention until the late 1940s when anti-tuberculosis programs were introduced and the death rate from tuberculosis declined dramatically.

As recommended in a recent publication on ecological studies in medical anthropology (McElroy and Townsend, 1989), the present study of tuberculosis focuses on examination of these quantifiable interactions within the ecological framework. However, the picture hardly seems complete. Therefore, this study probes a third perspective, that of the individuals who had tuberculosis; qualitative information from the "emic" perspective of the people involved. Disease as experienced by the population being studied is not usually a component of ecological studies. Because the framework allows for this analysis, however, individual coping should be included in discussions of the ecology of disease. Alland (1966:48) recommends that ethnomedical factors be examined in the ecology of disease, and Armelagos et al (1978:81) indicate that the examination of this perspective, within the context of an ecological study, provides one

way in which two divergent emphases in medical anthropology, the ecological and the ethnomedical, can be reunited.

1.2 Tuberculosis

In the context of the ecological framework used in the present study, tuberculosis is defined biomedically as a "disease".

Tuberculosis is an ancient disease that was documented as early as 3700 B.C. in Egypt (El-Najjar 1981:85). The first individual to recognize the contagious nature of the disease was Girolama Fracastoro (1483-1553) (El-Najjar 1981:85), and in the seventeenth century Franciscus Sylvius discovered tubercles, small nodules like sand grains, in victims lungs (Campbell 1953:54). In 1865, Jean-Antoine Villemin demonstrated that tuberculosis was transmittable, rebutting previously accepted theories that it was inherited, and in 1882, Robert Koch isolated the bacillus and demonstrated that it was the agent responsible for tuberculosis (Koch, 1882: cited in El-Najjar 1981:86).

Tuberculosis was present in the New World prior to contact. However, the devastating impact that tuberculosis had on indigenous populations in terms of high death rates, and the nature of the tuberculosis illness experienced by these groups, once they settled in larger population groups, appears to indicate that it was rare in this population prior to this time. The discussion of the tuberculosis epidemic in Saskatchewan presented in Chapter 5 illustrates tuberculosis as a virgin soil epidemic. Tuberculosis differs from other communicable diseases in several respects. In a population with a long disease history with tuberculosis, the disease is not extremely infectious. A factor which operates against the survival of the bacillus is that it becomes buried in the tissues and bodily defences often prevent its further spread. Unlike other infectious diseases, the incubation period of tuberculosis is highly variable, ranging from a few weeks to a lifetime. Tuberculosis is a two stage disease, with primary infection often removed by years from

onset of symptoms. With tuberculosis "the resistance which develops from successful recovery from the primary infection is often not sufficient to rid the body of invading organisms", as a result there always exists a risk of reactivation (Comstock 1975:368).

Signs and symptoms of the disease vary according to the site of infection. Today more than 90% of first infections are in the lung. Other modes of presentation include miliary disease; tuberculous meningitis; lymphadenitis; and tuberculosis of bone, peritoneum, kidney, skin, or eye. The onset of tuberculosis may be acute, duration from inception to death may be only three weeks in some cases of tuberculous meningitis (Klein et al 1982:263-264).

The characteristics of tuberculosis for a virgin-soil population are quite different from those of a population with a long history with the disease. When tuberculosis is first encountered by a population, the disease is quite infectious because the bacillus does not become buried in body tissues. In a population experiencing the disease for the first time, the course of the disease is acute not chronic. In addition, in these populations, tuberculosis is not localized in the lung, generalized tuberculosis, and other forms such as glandular involvement are common (Ferguson 1928; 1933).

Among the Indian population of Saskatchewan, during the initial phase of the tuberculosis epidemic, all forms of the disease were present, pulmonary, osseous, glandular, and meningeal. The most common fatal form of tuberculosis among Indian infants was generalized tuberculosis, while young and older adults died most often from pulmonary tuberculosis (Ferguson 1928:15,43).

The most serious form of tuberculosis, tuberculous meningitis, was almost always fatal prior to the availability of the anti-microbial drug treatment in the late 1940s. Its onset is characterized by the classic symptoms of vomiting and headache, followed by drowsiness and convulsion a few days later (Grzybowski 1983:25-26).

Scrofula (cervical adenitis or glandular tuberculosis) was at one time a common form of extra-pulmonary tuberculosis, and remains much more common today in certain populations. Cervical adenitis affects the lymph glands in the neck, and the major sign is development of a lump or lumps in the neck (Grzybowski 1983:26-28). Several of the individuals interviewed in the present study, were hospitalized for enlarged tuberculous glands.

When one talks of tuberculosis, post-primary pulmonary tuberculosis is the disease to which they are most often referring. This is the most important form, and today the most common form of tuberculosis. **It is the only form of tuberculosis which is infectious.** Symptoms are respiratory or constitutional. Respiratory symptoms include coughing and sputum production. Constitutional symptoms include lassitude, loss of weight, night sweats (relatively infrequently), and complaints of feeling hot and feverish (Grzybowski 1983:31-34).

All forms of tuberculosis are caused by an aerobically spread bacteria. *Mycobacterium tuberculosis*, the tubercle bacillus, is a slow growing, acid fast organism. *M. bovis*, the agent of bovine tuberculosis, is now rarely the cause of tuberculosis in humans (Stein et al 1982:264).

Anti-tuberculosis programs are generally divided into two foci: the curative and the preventive. The three most commonly used case finding tools in tuberculosis diagnosis are: tuberculin skin tests, which indicate infection; chest x-ray examination; and bacteriological examination of the sputum by smear or culture to determine presence of disease (Grzybowski 1983:91). Before the era of anti-microbial drug treatment which began in the late 1940s, there was no effective treatment of tuberculosis. Tuberculosis patients were "managed". Through the years, this management evolved through several stages from exercise, such as horse riding; followed by the era of general rest; and reaching an extreme with absolute bed rest in a sanatorium where a patient was not

allowed to move. Following this came the era of securing "localized rest" for the affected lung through artificial pneumothorax (lung collapse therapy). Resection of the diseased portion of the lung came into vogue for a short period in the early years of the anti-microbial era, but was found to be unnecessary a short time later (Grzybowski 1983:50).

Although the value of sanatorium treatment before the era of anti-microbial drugs has been questioned, some people who rested and were fed a healthy diet appeared to get well; one third of patients with advanced disease and positive sputum smears recovered without any help. It seems reasonable to expect that rest (general and local-collapse therapy), together with good nutrition, may have increased the recovery rate to a limited degree simply by enhancing the tendency of tuberculosis to heal on its own and by increasing natural resistance. Most important, isolation of patients in sanatoria served a very useful function of removing the sources of infection from the community (Grzybowski 1983:49-50).

After about 1950, specific drug treatment for tuberculosis, changed the whole picture of tuberculosis care. Today therapy consists of treatment with antimicrobial drugs and occasionally, hospitalization (Grzybowski 1983:50-51).

In Saskatchewan the prevention of tuberculosis infection was as important to the reduction of the disease-burden in the Indian population in the 1950s as was treatment and isolation of those with the disease. Preventive programs involve BCG vaccination and chemoprophylaxis (Grzybowski 1983:92). The primary aim of preventive tuberculosis programs is to reduce future infection and morbidity. BCG vaccination is given to uninfected tuberculin negatives with a high risk of infection. Chemoprophylaxis is given to people already infected; its purpose is to diminish an individuals chances of developing the disease (Grzybowski 1983:90).

In discussing the modern epidemiology of tuberculosis, Comstock (1975) recommends that tuberculosis should be studied as a two stage process: (1) infection with

the tuberculosis bacillus, and (2) development of the disease. As early as the 1920s, Dr. Ferguson subscribed to this dichotomous view of tuberculosis (Ferguson 1923). Comstock (1975:368) and Ferguson (1923) propose this distinction be maintained in studies of the epidemiology of tuberculosis for three reasons: because acquisition of tuberculosis infection can be far removed from the development of disease; because the incubation period of tuberculosis can be from a few weeks to a lifetime; and because known risk factors for infection with the tubercle bacillus are very different from the risk factors for developing the disease.

The risks for being infected with tuberculosis are mainly environmental factors which are extrinsic to the individual including social-environmental factors. Conditions predisposing one to developing the actual disease, on the other hand, are for the most part individual (or population) intrinsic or inherited characteristics, such as the degree of acquired resistance (Comstock 1975:378).

Based on data from the Indians of the Qu'Appelle Indian Health Unit, Ferguson (1934:18-19) found several major lifestyle risk factors for infection including: the move to a fixed residence on reserves and contact with the surrounding population; concentration of Indian children in boarding schools; and absence of sanitation. Dramatic housing and sanitation changes associated with a sedentary reserve lifestyle also contributed to the acuteness of the tuberculosis epidemic in the Indians (Ferguson 1928:40). In addition, the extermination of the buffalo and the sudden dietary change associated with a rationed diet were important predisposing factors in the acuteness of the tuberculosis epidemic among the Plains Indians (Ferguson 1928:36).

The combined effect of changed and inadequate food, housing and sanitation did not have a noticeable effect on Indian tuberculosis morbidity (Ferguson 1928:46). However, at the onset of the epidemic it ensured the complete tubercularization of the

population.² Because the Indians of Saskatchewan did not have the opportunity to build up resistance to the disease, these social environmental factors also initially had an effect on the tuberculosis death rate. When a comparison of tuberculosis mortality was made between the File Hills Demonstration Colony residents, where comfortable homes with sanitary facilities similar to those of the surrounding population were provided for young Indian families, and the adjacent reserve population, it was found that 14% of the third generation of the Colony had died from tuberculosis, whereas 21% of the same generation in the reserve population had succumbed (Ferguson 1928:42,46).

What, then, are the factors that determine why one infected individual develops the disease while another will not? Following Ferguson's and Comstock's intrinsic extrinsic dichotomy, these would be individual host factors, including age, sex, race, nutrition, and socio-economic status. Several personal physiological factors that may predispose an infected individual to developing disease, include silicosis or silica exposure; diabetes, especially juvenile diabetes; chronic alcoholism, associated with more frequent exposure and possible under-nourishment; and pregnancy (Grzybowski 1983:40-43). In addition, malnutrition is widely believed to favour reactivation of latent tuberculous foci (Comstock 1975:377). Noting that cases of miliary tuberculosis and tuberculosis meningitis in children often appeared to originate at the time of an attack of measles or pertussis, Ferguson (1928:32) also contended that the presence of intercurrent epidemics of influenza and measles in the population were coincident with a marked, temporary reduction in resistance to tuberculosis, and the subsequent development of the disease.

Today the debate continues regarding the origin of a perceived difference in tuberculosis resistance among population groups of varying ethnic origins. For example,

² In 1922 93% of the Indian population in Saskatchewan surveyed were infected, compared to 53% of the non-Indian population (Ferguson 1922:2).

tuberculosis rates in recent immigrants to Canada parallel the rates in their country of origin (Grzybowski 1983:82-83). For the most part, physicians, anthropologists and public health specialists acknowledge that a group's natural resistance to tuberculosis develops over centuries of exposure to the bacillus. Therefore, a population which encountered the bacillus in more recent times, a population that was not familiar with it, such as the Indians of the Americas, would have less natural resistance (Grzybowski 1983:5). Ferguson (1928; 1934) provides evidence to demonstrate the increased susceptibility of "primitive races" to tuberculosis, based on his work among the Indians of the Qu'Appelle Indian Health Unit, in Saskatchewan. He found that: "However bad the living conditions, however changed the environment, or however distressing the mental factors, the tuberculosis death rate among civilized people has not approximated that among these primitive Indians" (Ferguson 1934:21).

A recent addition to the debate on the "genetic susceptibility" of certain populations to, the previously unknown, infectious diseases, is presented in Clark et al (1987). They argue that the high susceptibility of the Amerindian to the infectious diseases after contact was the result of "enforced changes in ecological and environmental factors rather than of exposure to a new infectious disease" (Clark et al 1987:45). If, however, one uses the dichotomous distinction outlined above, in which environmental and agent factors are important to infection, and host factors are the most important in terms of who actually gets the disease, the model in the paper by Clark et al, (1987), would serve to explain only the first of these, increased infection. Environmental and ecological changes were very important to the high infectivity rate of the Amerindian to tuberculosis. However a lack of population resistance to tuberculosis determined their high death rates. This model (Clark et al 1987) does not account for the high mortality rate from tuberculosis among these populations. It does not explain why so many of the Amerindians died of the disease.

1.3 The study population³

The Registered Indians of Saskatchewan constitute the population of interest for the study.⁴ This particular group was selected because tuberculosis was the leading cause of death in the population from the 1880s into the 1950s, and because their tuberculosis experience has not been studied in its entirety. Their experience with tuberculosis is amenable to analysis because the tuberculosis epidemic in this population is fairly recent and because data are available. In addition, the population is definable, unlike the Metis population for example, for whom census data are unavailable. For interview purposes the population provided an indeterminate number of people who had tuberculosis, since it was so prevalent. In terms of tracing the history of their tuberculosis experience then, epidemiological, historical and first hand interview data can be used together.⁵

At the turn of the century in Saskatchewan there were five Indian groups: the Cree, Chipewyan, Assiniboine, Saulteaux and Sioux (Pohorecky 1970:ii). These groups signed treaties with the Government of Canada, beginning in 1871, which limited their nomadic lifestyle and confined them to reserves.⁶

Early census information is not available for the Plains tribes, however, several population estimates suggest low population densities, and declining populations into this century mainly due to the impact of the newly introduced infectious diseases. In Canada,

³ For a more complete discussion of the study population see Appendix A.

⁴ When the term Indian is used, it is referring to "Registered Indians" or "Status" Indians as defined by the 1951 Indian Act.

⁵ The epidemiological analyses of tuberculosis in this study focuses on the entire Indian population of Saskatchewan. However, mainly for logistic reasons interviews were conducted with Indians representing two cultural groups, the Plains Cree and the Assiniboine of south and central Saskatchewan.

⁶ All of the groups except for the Sioux received "annuities" in payment for surrendered lands (Kehoe 1975:152).

the Dominion Blue Book fixed the Assiniboine population of Alberta and Saskatchewan at 1,042 in 1890, a decline from an estimate of 3,040 in 1842 (DIAND 1986b:4).

Life on Saskatchewan Indian reserves, for the first several decades of their existence, was influenced if not determined by the interpretation and administration of the laws of Canada pertaining to the Indians by Indian Affairs, and the local Indian agents, as well as by the religious and educational policies of the Christian missionaries.

The role of Indian Affairs following the signing of the treaties, was defined by the Indian Act of 1876 (Ponting and Gibbins 1980:8). This Act gave the power to the government to control Indians life on reserves. It forbade the selling, alienation, or leasing of any Indian reserve land unless it was first surrendered or leased to the Crown; and although the act provided for the election of Indian band chiefs, it gave them limited authority (DIAND 1980b:60-61). The Act and subsequent amendments attacked traditional Indian values, and was aimed at annihilating these traditional values through education, religion, new economic and political systems, and a new concept of property (Tobias 1983:44-45).

Throughout the first several decades of the twentieth century, conditions on Indians reserves, in social services, health, education, and general living facilities deteriorated (Cuthand 1978:41). During this time period, little attention was paid to Indian matters (Tobias 1983:51). After 1945, however, interest in the Indians' situation increased. Public concern, spawned by the massive Indian contribution to the War effort, focused on the treatment of the Indian as a second class citizen (Tobias 1983:51). The most substantial changes occurred in 1951 with a new Indian Act.

A survey of Indian participation in Canadian economic and political life was commissioned in 1963 and released in 1966. A Survey of the Contemporary Indians of Canada: A Report on Economic, Political, Educational Needs and Policies (The Hawthorn Report), examined reserve educational, economic, and political conditions

(Dept. of Citizenship and Immigration, Indian Affairs Branch Annual Report, 1963-64; Ponting and Gibbins 1980:15-16). The report found a discouraging situation with regard to education (DIAND 1980a:46). Recent changes indicate that education levels have improved since the early 1960s. In 1976, the percent of Indian children remaining in school until grade 12 had increased from 6% to 20% (as compared to 75% of the non-Indian population) (DIAND 1980a:47).

In terms of the economic situation, the Hawthorn Report found that most of the Indians in Canada were economically depressed and under-employed, and that transfer payments represented 31.4% of total earnings from employment (Hawthorn Vol. 1 1966:46). Although the report found that geographical factors of distance and isolation from job centres were important factors which contributed to the depressed economic situation, the report concluded that "the forces impeding the economic development of Indians are social, cultural or psychological" (Hawthorn Vol. 1 1966:54-55).

In terms of Indian political organization, although the 1951 Indian Act introduced measures allowing band councils increasing responsibility for local government, throughout the 1950s and 1960s most Indian communities continued to be administered by Indian Agents. Most bands had neither the finances nor the institutional structures to take over the administration (DIAND 1980a:82).

In addition to the painfully slow evolution of self-determination for the bands on the reserve, into the 1960s Indians continued to have no national political voice. Bands remained politically isolated from one another because they lacked the resources and training for political action and because no permanent national unifying organizations existed which could air their collective demands. Although they were given the federal vote in 1960, the Indians also chose to remain isolated from non-Indian political structures (DIAND 1980a:82).

Overall, two major, complementary themes recur. Native Canadians have been placed under the paternalistic but at the same time rather neglectful control of the Canadian federal government. Until recently, control of Indians' daily lives was to a surprising extent maintained by the federal government as for instance in the definition of their health needs. At the same time, very little was actually done for them until relatively recently in facing what may have been their most serious problem, tuberculosis.

1.4 The chronology of tuberculosis

Tuberculosis among the Indians of Saskatchewan can be characterized by several chronological phases during which the health status of the Indians changed, and health services to the population evolved. During the pre-contact era, the accumulated evidence suggests that tuberculosis was present in the Americas, however it was rare (Buikstra, 1981). The rampant, epidemic phase of the disease began among the Indians of Saskatchewan in the early 1880s when they began settling on reserves (Ferguson, 1928). Tuberculosis became endemic in this population in the late the 1920s. It remained the leading cause of death until 1951. Throughout most of this time period, no effective, organized tuberculosis services existed for the Indian population. The sanatorium period, the period during which the Indians received sanatorium treatment for tuberculosis, began in 1945. During this era of active treatment, tuberculosis mortality declined dramatically. Following the decline of tuberculosis mortality, in the 1960s, tuberculosis was treated on an out-patient basis.

1.5 Scope of the study

In examining tuberculosis among the Indians of Saskatchewan from 1926 to 1965, this study uses a broad ecological model which allows for a diverse array of interactions to be explored. The study first looks at tuberculosis in its historical and epidemiological

context throughout the period of interest. In addition, the study examines the epidemiology and ecology of tuberculosis in relation to the provision of health services to the Indian population. And, to attain an additional perspective on tuberculosis among the Indians, the study probes individual Indians' perspective on tuberculosis and of the hospitalization experience. The introduction delineates this goal and the objectives of the study; briefly discusses tuberculosis defined biomedically; and introduces the study population, the Registered Indians of Saskatchewan.

The ecological theoretical orientation in medical anthropology is outlined in Chapter 2, and the ecological model used in the research is presented. In Chapter 3 the literature reviewed for the study is discussed. The research methodology and methodological limitations comprise Chapter 4.

Chapter 5 discusses the epidemiology and ecology of tuberculosis in the Saskatchewan Indian population. The earlier work of Dr. R.G. Ferguson is first reviewed. Numerous graphs and tables are presented to illustrate the course of tuberculosis in this population to the mid-1960s. The chapter concludes by discussing the factors that modified the course of the tuberculosis experience in this population.

Chapter 6 is a background chapter which is intended to put the epidemiology of tuberculosis in this population into its historical context. It reviews the development of health services to the Indians of Canada, focusing on tuberculosis services to the Saskatchewan Indians. In addition, the impact of these services on the health status of the Saskatchewan Indian population is discussed. It should be pointed out that this chapter is not a critical, substantive and complete analysis of these services.

The epidemiology and ecology of the tuberculosis and the history of medical services is followed in Chapter 7 by a review and discussion of several case studies of individual Indians who were hospitalized with tuberculosis. The major research findings and conclusions are summarized in Chapter 8 and areas for future research are presented.

2. THEORETICAL ORIENTATION

2.1 Introduction

The theoretical orientation in this study follows the ecological orientation in medical anthropology. An ecological model is developed based on several models presented in the medical ecological literature. This model demonstrates the complexity of the interactions which can be examined in an ecological framework, including interactions between three subsystems; the physical environment, the social environment, and the individual.

2.2 Theoretical orientation

The term "ecology", introduced by the German biologist Ernst Haeckel, was first used in print in 1870 (Hardesty 1977:7; Vayda and Rappaport 1968:478). As defined by the animal ecologist, W.C. Allee, ecology is "the science of the interrelation between living organisms and their environment, including both the physical and the biotic environments, and emphasizing interspecies as well as intraspecies relations" (Allee et al 1949:1 as cited in Vayda and Rappaport 1968:477).

Ecology as a distinct scientific discipline examining the complexities of this interplay between organisms and their environment developed in the twentieth century restricted for the most part to the study of plants and animals other than humans (Hardesty 1977:8). In anthropology the origins of an ecological approach lie in several different traditions of environmental explanation (Hardesty 1977:1). In the first two decades of this century two distinct environmental explanations which emerged were environmental "determinism" and environmental "possibilism". More recently, ecological studies in anthropology have followed one of two approaches: "cultural ecology" the methodology proposed by Steward (1955), and "human ecology" as outlined by Vayda and

Rappaport (1968) in response to the limitations of Steward's cultural approach.

In the general ecological model an ecosystem is defined as "a system of material exchanges among the populations of the several species and the non-living substances occurring within a demarcated area" (Rappaport 1969:184). For anthropologists, the territory of a local group can usually be considered as an ecosystem. The regional population in this model is an aggregate of local populations that occupy a geographical area. This conceptualization allows the ecological analysis to deal with the social environment of the local population in that they also participate in a second, larger regional population system (Rappaport 1969:185).

Rappaport (1969:186-187) suggests that ecological analyses should attempt to determine the mechanisms that regulate exchanges in the ecosystem. These include the homeostatic or self-regulating mechanisms that are built into systems. An ecological system is considered self-regulating when a change in one of the variables of the system which endangers the system as a whole, initiates an activity that returns its state to a safer level, through the process of negative feedback. In ecological systems, that include humans, the mechanisms of system self-regulation includes important cultural components. The ecologist is therefore concerned with behavioral as well as the morphological attributes of the organisms and population being studied (Vayda and Rappaport 1968:494). This in turn further suggests the important place of the "cognicized" environment in the analysis of material relations of a population (Rappaport 1969:187).

"In spite of a clear influence from cultural ecology, medical ecology most directly emerges from the general ecological rather than the cultural ecological trend in anthropological concern with the environment" (Singer 1989:225). This influence is conceptual in terms of medical ecology's selection of "human populations" as its units of analysis, and historical in terms of the influence of Vayda on the ideas of Alexander

Alland, "a founding father" of medical anthropology (Singer 1989:225).

Based on a review of literature encompassed within the rubric of medical anthropology, Fabrega (1972:167) identified two divergent emphases within the field: the ethnomedical and the ecological. More recently, a "critical medical anthropology", which addresses the political and economic determinants of health has also emerged (Baer et al 1986). Political economy models tend to focus on power relations. With regard to medical systems, political economists are often critically interested in the reason behind differential, substandard and even neglectful provision of health services to certain classes and ethnic groups. It is recognized that this perspective could have been used in this thesis, especially in an analysis of the history of the provision of treatment to tubercular Indians. However, given the complex breadth of the data and analysis already chosen, this was though inadvisable for the time being.

Studies termed ethnomedical are those which examine medical problems from the emic perspective of the group under study, and view "illness" as a culturally defined category. Ecological studies examine medical problems from an etic or outside perspective, utilizing the concepts and categories of Western biomedical science. In this approach, the important analytical unit is "disease" defined biomedically, not culturally defined illness. In its use of biomedical categories, this approach does not emphasize the beliefs, perceptions or practices of the group being examined, however, the adoption of a broad framework does not preclude emic analyses within the model. It tends to focus, however, on the presumed causes or consequences of disease, with an emphasis on social and cultural factors (Fabrega 1972:167-168). The ecological approach is biocultural in nature because of this combination of biological and cultural factors (Moore et al 1980:10). Fabrega (1972:191) labeled these studies "epidemiological or medical-ecological", since, as a rule, they tend to employ an ecological framework.

Medical ecology addresses questions dealing with population biology and human evolution. Medical anthropology studies that have been termed "ecological" are usually conducted in preliterate settings and the nature of the setting and the problems being studied often require a holistic, multi-level and exploratory orientation. In medical-ecological studies, cultural features such as the diet of the subjects, their health status and population demographics as well as features of their environment that affect adaptation, health status and social organization, are emphasized (Fabrega 1972:191).

In general, medical ecology adopts the view that health and disease are "reflections of ecological relationships within a population, between neighbouring populations, and among the life forms and physical components of a habitat" (McElroy and Townsend 1979:2). The ecological approach recognizes that particular environmental circumstances are contributors to the kind of disease endemic to a region, and the ecological approach is concerned with the effect of disease and health practices on the culture itself (Moore et al 1980:9-10).

Central to the medical ecological model, as with general ecology, are systems theory and the concept of adaptation (Singer 1989:226; Hardesty 1977:21). A system is defined as "a set of objects together with relationships between the objects and between their attributes" (Hall and Fagan 1956:18 as cited in Hardesty 1977:14). Systems theory is a method for studying complex situations which allows for the largest possible number of interdependent factors to be included in the analysis. Typically no assumptions are made about causes, direction of movement or particular outcomes (Bennett 1976:21). In any integrated system a change in any one component of the system requires compensation in other parts. Because of the nature of systems, no change is ever independent, all change has ramification throughout the system (Rappaport 1969:185).

Adaptive processes are characteristic of systems (Alland 1970; Hardesty 1977:22). Adaptation is the mechanism through which beneficial organism/environment

relationships are established and maintained (Hardesty 1977:21). For humans, as for other living things, "adaptation" implies the possession of the attributes making it possible to function effectively in a particular environment (Dubos 1968:83). Depending on the approach of the researcher, adaptation may be examined as a short-term adjustment mechanism, or a long term evolutionary process (Alland 1970:40-41). In both the long and short-term, adaptation occurs on several levels. Beneficial relationships with an environment are created by means of behavioral, physiological and genetic/demographic changes (Hardesty 1977:23,46). The success of humans as a species is a consequence of this ability to utilize this wide range of adaptive potentials. Throughout the course of human evolutionary history, genetic adaptations and physiological mechanisms were supplemented with social mechanisms when humans learned to function in complex social groups. While genetic and physiological mechanisms continue to operate within human populations today, the control of the environment through technology has progressively decreased their importance to the overall human adaptive process (Dubos 1968:83-85).

Behavioural adaptation is characterized by flexibility and rapid adjustment to sudden environmental change because it is based on learning. Two kinds of behaviour may be adaptive: idiosyncratic behaviours, i.e. the unique ways that individuals cope; and cultural behaviour, adaptations of groups' patterned, shared, or traditional behaviour (Hardesty 1977:23-24).

Since behavioural adaptation is rapid, it is particularly suited to temporary environmental fluctuations. Where a disturbance continues, however, physiological adaptation may replace or supplement behavioural ones. For example, if someone is cold they will build a fire, a behavioral adaptation. If the cold continues shivering, a physiological response, may occur. Physiological responses are generally not as fast or as varied as behavioural ones. If the environmental changes are long-term or permanent, genetic adaptation may occur. At the time of environmental shock or

change, all three levels are activated simultaneously (Hardesty 1977:23-24).

Behavioural adaptation may be technological, organizational or ideological (Kaplan and Manners 1972:112). Technological, organizational and ideological changes help people to adapt by providing basic solutions to environmental problems (the focus of cultural ecology); by improving the effectiveness of these solutions; by providing adaptability; and by providing awareness or recognition of environmental problems. For example, cultural behaviour can serve as a buffer between humans and random fluctuations in their environment such as the adaptiveness of breaking up into small groups (Hardesty 1977:24,27).

Reversible and irreversible physiological adaptations may be made by the individual and populations in response to environmental stimuli (Hardesty 1977:31). For example, when humans migrated and began to colonize the globe during the Late Paleolithic, they underwent many anatomical and physiological changes to adapt to diverse environments (Dubos 1968:83).

Genetic and demographic adaptation is more permanent, and slow to activate. It generally takes several generations. This level of adaptation affects groups through the process of genetic selection. Demographic characteristics which usually change slowly include birth and death rates, age structure, growth rate and population size (Hardesty 1977:32-33). Animals in the wild achieve adaptation to their environment chiefly through genetic mechanisms. For a long time after their emergence humans also relied on attributes of their genetic endowment to overcome the dangers to which they were exposed (Dubos 1968:83).

Demographic, physiological and behavioral adaptations are all equally important. These different but related types of adaptation contribute through time to a systemic biocultural integration (Moore et al 1980:57).

In order to examine the role of adaptation to disease in a long-term evolutionary process, Alland (1966; 1970) developed a framework within which he related disease and cultural traits (Landy 1977:5). Alland (1966:41) advocated what came to be referred to as a medical-ecological approach through his consideration of characteristics of the agent, the environment, and the host as important to the culture/disease relationship and in his suggestion that "the units of such studies is a human population characterized by a configuration of biological and cultural traits and occupying a specific ecological space" (Alland 1966:41).

Recognizing that the framework he proposed was complicated, Alland (1966) delineated several of the elements which he believed should be considered in the disease/culture relationship. Because practically all behaviour patterns will affect disease incidence in some way, his framework included consideration of the mutual adjustments that occur between host and parasite and the cultural practices which indirectly affect health and fertility levels. Other important components he suggested should be a part of the model were: the introduction of new technology, because in a system any change is likely to upset the ecological adjustment developed in times of relative stability; the medical system; and acculturation, because a change in cultural practices or the cultural environment may provide new avenues for the invasion of disease organisms. Finally, because like other change in environmental conditions the introduction of new disease organisms will upset the existing ecological relationships, he included the introduction of new diseases through contact where genetic and cultural adjustments are upset with the introduction of new disease organisms (Alland 1966:46-48).

Alland (1970) synthesized his earlier work and presented a useful theoretical framework for medical anthropology (Landy 1977:5) in which cultural and physical anthropology are linked through the examination of biological and cultural evolution as one process. To demonstrate that the Darwinian model of biological evolution can be

applied to cultural evolution, Alland (1970) reviewed a number of ideas and studies from diverse fields bearing on the phenomena of disease, and related them analytically to problems of human and cultural evolution. He developed the view that culture is an adaptive response to environmental pressures, and emphasized that, as humans changed the environment through the adaptive mechanism of culture, this changed environment then acts as a selective agent on human biology as well as on behaviour (Fabrega 1972:196).

Within such a framework, epidemiological patterns, which vary among populations, provide a wealth of material for the analysis of the adaptive process. "Any change in the 'behavioural system' is likely to have medical consequences, and, in addition, induced or natural alterations in the environmental field provide new selective pressures relating to health and disease, which must be met through a combination of somatic and non-somatic adaptations" (Alland 1970:49).

Since 1970 and Alland's pioneering theoretical statement, ecological studies in medical anthropology have proliferated. However, as Armelagos et al (1978:71) indicate, many models of the disease process continue to simplistically examine linear cause and effect relations between pathogen and host. In response, the authors developed a model of disease "which attempts to relate in a systemic fashion the full spectrum of variables which influence the disease process" (Armelagos et al 1978:71). The model focuses on disease and can be used to examine the potential of various environmental insults on the organism which may cause disease. It can also be used to examine the impact of disease on the cultural system of the host population, and the nature of the responses to these insults.

Focusing on the factors involved in the health-sickness process, Moore et al (1980) developed a more complex and holistic model of the human ecosystem within which the interrelationships between health and disease, the environment and culture can be

examined. The model that they propose consists of two major subsystems. The first subsystem includes environmental factors at two analytical levels; macro- and micro-environmental variables. Both the macro and the micro environment include inorganic, organic (all living matter) and human-made sociocultural variables. The second subsystem is at the level of the individual organism. Factors included in this subsystem represent a holistic view of an individual's adaptive capacities in the health-sickness process (Moore et al 1980:15).

The macrolevel of the environmental subsystem in this model involves large aggregates of populations, be they societal, national, hemispheric or even global. The microlevel, or local environment, is composed of smaller populations that share a unique inorganic, organic and human-made environment (Moore et al 1980:17). It is at the micro-level (local level) that ecological analyses of the interrelationships within the system is viable; it is more homogeneous, smaller and easier to handle, and generally there are fewer variables.

Sickness is manifested at the individual level. Because of the role of the individual in adaptation, this level of analysis is an essential component in an ecosystemic analysis of human health and sickness. A human being represents the combination of inherited, species-specific characteristics and culturally-determined traits and the influences of biology and culture are inseparable in terms of individual adaptive capacity. Biological factors set certain adaptive limits to survival - each physiological system has parameters for adequate functioning and these are similar in all human groups (Moore et al 1980:20).

Although these models outline the elements of an ecosystem in which the health/disease process can be examined, in their application many of the methodological difficulties inherent in the earlier general population ecology models, such as those proposed by Vayda and Rappaport (1968), recur. For example, the issue of defining

ecosystem boundaries is addressed in part by Moore et al (1980) in including two environmental levels, the macro and the micro. However, suggesting that local environments are ecosystems composed of smaller populations that share an unique inorganic, organic and human-made environment, still does not define the boundaries of these groups.

In terms of developing a model for this research, I used the evolutionary framework that Alland (1970:34) advocates within which culture is viewed as an adaptive response to environmental pressures in order to examine the influence that the infectious diseases had on humans. To examine this relationship, the utility of this approach is the ecological perspective; the concept of "adaptation of cultural systems"; and the synthesis of culture and biology.

To find an articulated, systemic model which demonstrates the complexity of the interactions in human ecosystems the utility of the model proposed by Armelagos et al (1978) is in its basic presentation of the relevant interrelated factors allowing for a systemic analysis of the interaction between culture (an environmental variable) and disease (a host/individual condition). The more complex model presented by Moore et al (1980) demonstrates these interrelationships occurring in two interacting subsystems. This model incorporates the concepts of adaptation and systems and most closely approximates the model needed in this research. As do Alland (1970) and Armelagos et al (1978), Moore et al (1980:10) indicate that their model can be used to examine the effect of disease and health practices on culture. Its main weakness in terms of examining the interaction of disease and human populations, are in defining those populations for analysis, and its emphasis on the individual (the disease end of the spectrum), relegating the social environment (of which culture is a major component) to a variable in the environmental subsystem.

The model used in this research (Figure 2.1) is drawn mainly from the work of Armelagos et al (1978) and Moore et al (1980). The social environment, including culture, however, is articulated as an additional subsystem.

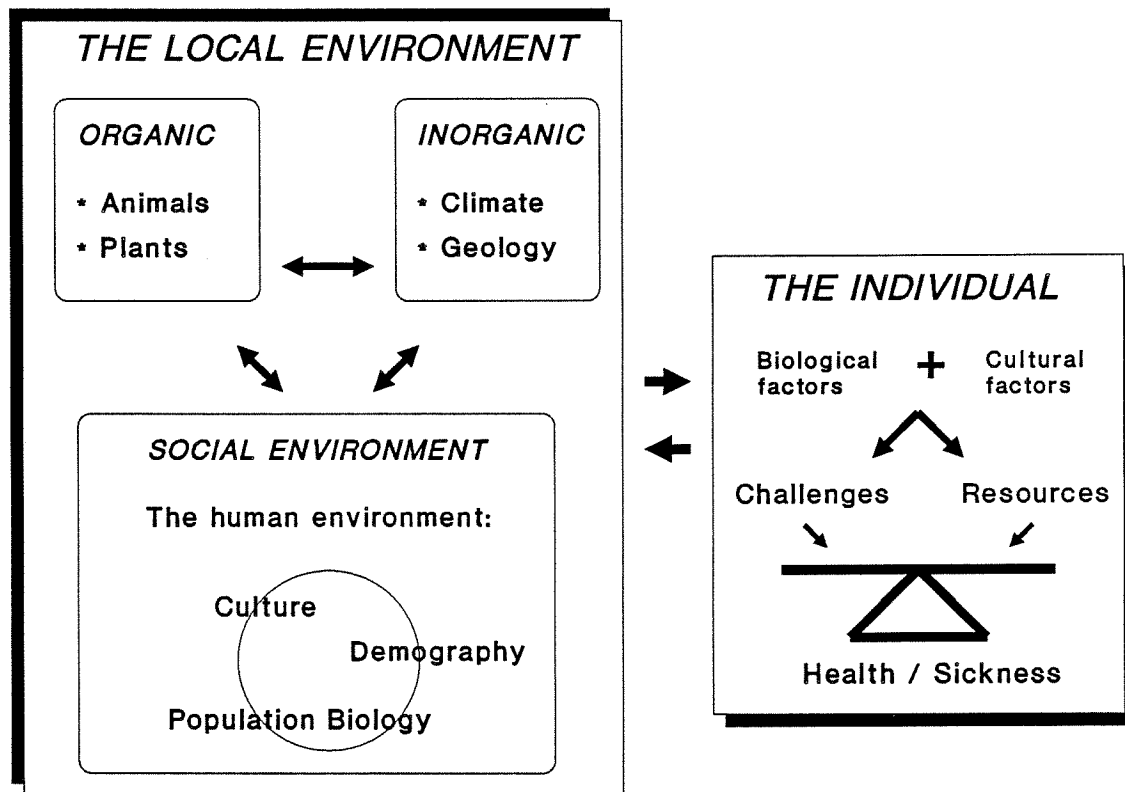


Figure 2.1 Ecological Relationships in Human Health

Figure 2.1 is composed of three subsystems. Subsystem I, the local environment, is understood to be a part of a larger, macro-level or global environment (May 1957:100; Moore et al 1980). In recognizing these broader environmental components, macro level variable that influence health such as political and economic conditions and social processes can be incorporated into ecological models of disease. Subsystem II, the social environment, includes culture, population biology and demography, and Subsystem III, the individual, is the level at which health/sickness is manifested.

The local environment is complex and includes all of the factors external to the individual that may affect it in any way. The environment consists of obvious physical features such as habitat, as well as the not so obvious; organisms that transmit disease; competitors; climate; shelter; the cultural setting of the individual; demographic population structure; and other members of the same population.

Four patterns of change characterize environments. These may be stimulated by the introduction of new elements into the environment; changes in frequency of occurrence of environmental conditions; changes in the magnitude of those elements; and changes in duration (Bates and Plog 1990:79).

The environment is made up of three types of variables; inorganic, organic, and social. Inorganic environmental stimuli, climate and geology, include such components as temperature, humidity, air composition, atmospheric pressure, soil, water, static electricity, and radioactivity. The organic environment in this model encompasses all living things in the environment besides humans, including all plant and animal species, predators and disease agents, such as protozoan, metazoan, bacterial, Rickettsial, viral organisms, as well as disease vectors (May 1957:100).

The social or human environment, articulated here as an additional subsystem, includes three components: population biology, demography and culture (Wellin 1977:56). Population biology includes the groups genetic makeup as well as immunological and

other biological factors (Moore et al 1980:19). Demography includes variables such as the age and sex structure of the population, and fertility rates; settlement patterns, occupation, work roles and status; household size and composition; (Moore et al 1980:19) and population size, density and movement. Population size, density and movement reflect the disease-history of populations and are very important to infectious disease transmission (Cockburn 1971; Dunn 1968; Wirsing 1985). It is mainly at the demographic level that the effects of disease on human populations and population changes precipitated by the infectious diseases have been examined (Hader, 1986).

In various ecological analyses, culture has been examined at different levels: the systemic level of technological, ideological and social systems (Armelagos et al 1978:74-76); the institutional level (Bennett 1976:234); or at the more specific level of cultural traits (May 1957:112; Vayda and Rappaport 1968:494).

Moore et al (1980:19) suggest that the important cultural variables in ecological analysis include: ideology, custom and cognitive factors; social and political organization; technology; and, the medical system. The components of culture in their analysis include both social institutions and what they term expressive systems. These include institutions such as kinship, religion, law, education, economics, medicine; and values, beliefs, language, play, art, myth, folklore. Moore et al (1980:19) also look at specific cultural traits/behaviours including eating, sleeping and mating; cultural practices such as religious pilgrimages; and social institutions that bring people into contact.

Vayda and Rappaport (1968:494) are interested more in this level of cultural "traits" which reflect adaptations such as ways of defining social groups, ceremonial feasting, and human sacrifice. May (1957:112) also focuses on traits, human ways of life, taboos and other beliefs, cooking and eating habits, and social customs.

Other sociocultural characteristics, or traits which have been delineated in ecologically-oriented analyses include child rearing practices, learned defence mechanisms

and coping practices in dealing with stressors, family structure, the nature of family functioning and the communication pattern within the family. On the broader level, the nature of decision making groups and institutions and the nature and efficacy of the group's medical care system are also important to adaptation (Lumsden 1975:213,217). Some possible group adaptive responses include revitalization movements, mastery of the stressor; panic, revolution as an adaptive response; migration; mass apathy and alcoholism (Lumsden 1975:220).

Alland (1966:48) recommends that ethnomedical factors should also be considered in the ecology of disease, including: the way in which a culture defines disease, the way the group organizes themselves towards the treatment, and the social organization of treatment. They have, however, not been incorporated in most of the ecological studies of disease (Armstrong, Goodman and Jacobs 1978: 81).

Specific cultural factors that have received attention in the medical anthropology literature in relation to health include: diet, malnutrition/starvation (Wood 1979; Cook 1973; Kagan and Levi 1974; Dunn 1968; Wirsing 1985); housing and sanitation (Dunn 1968; Cockburn 1971; Kagan and Levi 1974; Wirsing 1985); psychosocial factors/cultural psychology (Cook 1973; Kagan and Levi 1974); ideology (O'Neil 1981; Young 1976); health care services (O'Neil 1981; Young 1984 and 1988; Stymiest 1976); stress (Lumsden 1975); and rapid cultural change and acculturation (Mason 1974; Dressler 1979; Kraus and Buffler 1979; McElroy and Townsend 1989; Ferguson 1928).

The third subsystem articulated in the model, the individual, is an important component of ecosystem analysis of human health and sickness because it is at the level of the individual that sickness is manifested, and because of the role of the individual in adaptation. The individual is composed of inherited biological as well as culturally-determined characteristics (Moore et al 1980:20). These include human behaviour, genetic make-up, age, sex, physiological state, psychological and nutritional factors, and

prior disease experiences (Lilienfeld and Lilienfeld 1980:47). Cultural and/or biological personal variables are intimately tied together in determining an individual's adaptive capacity, for example, through determining a person's susceptibility to disease (Moore et al 1980:20; Lilienfeld and Lilienfeld 1980: 47).

Individual cultural and biological factors, alone or in combination, may be predisposing or they may be preventing; they may keep the disease agent away from the individual or they may bring them closer together. In this model, they may represent challenges to an individual's health or resources that an individual can draw on.

2.3 Health/Sickness Dynamics

Once the elements of the ecological model are delineated, analyses of the interactions of the variables provides a tool for examining the multi-factoral dimensions of the health/sickness process. Examination of these interactions provides a way of discerning how human populations have adapted through physiological, genetic or cultural mechanisms in the short and long term to deleterious factors in the environment. Because the protective value of particular biological and cultural traits against disease vary from one environment to another, ecological analysis including the environment is essential to a study of the relationship between culture and disease (May 1957:111).

Disease is caused and influenced by various sources in the organic and inorganic environments. It is a complex process. Disease does not result merely from an accumulation of environmental factors but rather from their interaction (Moore et al 1980:20). Inorganic factors of climate may affect humans and other living creatures directly through the immediate effect on tissues. They may also affect the organic environment indirectly by establishing the conditions suited to the development of other forms of life such as disease causing organisms, vectors, and intermediate hosts, which in turn may react upon humans (May 1957:100-101,104; Moore et al 1980:17-18).

In terms of the social environment, cultural traits are always involved in the pattern of disease occurrence and infectious disease transmission. They are instrumental in either bringing together the environmental challenge and the host or in keeping them apart. The influence of culture may be felt in a variety of ways:

1. Culture may act as an agent of environmental change, and as a result change the disease pattern through changes in the physical or the organic environment;
2. Culture may induce changes in the human genetic makeup, for example through inoculation increasing the disease-resistance of a population (May 1957:109-110);
3. Pathogenic stimuli may be inherent in human's way of life such as harmful elements in human diets (May 1957:101);
4. Culture may be a link or a barrier between environmental stimuli and humans (May 1957:109-110). Functioning within the total environmental framework, culture acts as an intervening variable which may alter the frequency or intensity of exposure to organic and inorganic elements. Through the process of pasteurization, for example, culture mediates a population's interaction with other parts of the environment (Armstrong et al 1978:75).

Cultural behaviour patterns may also affect susceptibility to and transmission of disease (Moore et al 1980:17) by altering the interaction between humans and pathogens. Customs such as eating, sleeping and mating practices can influence the transmission of disease. Settlement patterns, occupation, work roles and status are other culturally determined elements that may influence the incidence of various diseases. Cultural practices such as religious pilgrimages may be instrumental in curtailing or increasing disease occurrence. Events that put people into contact such as holidays, and feasts are important; and social institutions such as schools that bring people into contact may act as breeding grounds for new diseases. In addition, culture plays an important role not

only in disease acquisition, but in how it is subsequently treated (Moore et al 1980:19-20).

It is only through using an ecological model that all of the environmental factors relevant to the production and transmission of disease can be delineated. The model is also valuable in discerning how individuals and human populations have adapted physiologically, genetically and culturally to deleterious factors in the environment. Individual responses to environmental stimuli are a result of the interaction of biological and cultural factors that determine individual adaptive capacity. These include the genetic material that humans are made of (May 1957:107); behavioral practices of individuals which affect their physiological/biological selves such diet, habits such as drinking or smoking, rest, or relaxation (Moore et al 1980:21); and the shape in which an individual finds themselves as a result of their evolutionary history and past experiences (May 1957:107; Dubos 1968:52). These individual biological and cultural factors (including past experiences) interact to determine whether environmental inputs represent challenges or resources for the health of the individual.

At the level of the population, adaptation may be demographic (genetic), physiological (biological) or behavioral (cultural). In response to the high mortality associated with epidemic diseases, demographic adaptation usually involves increased fertility levels and higher birthrates, and changes in the age distribution of the population. Physiological/biological adaptation includes, for example, population acclimatization to unique altitudes; or the development of population resistance to certain infectious illnesses which are generally built up over several decades. The best example of behavioral/cultural adaptations to disease in the environment is the development of a medical system; or within the system, the development of a particular medical technology such as pasteurization or immunization.

Demographic, physiological and behavioral adaptations are all equally important in contributing through time to a systemic biocultural integration (Moore et al 1980:57). Most of the medical ecological literature, which examines the adaptation of human populations to disease, focuses on the first two levels; the demographic and the biological. Although health and disease in their feedback effects on culture can be examined using an ecological framework, even in the anthropological literature, the relationships is seldom explored.

2.4 Summary

This research follows the ecological orientation in medical anthropology. Although medical ecology emerged as a part of a flurry of activity in medical anthropology in the late 1960s and early 1970s, a cogent methodological foundation for medical ecological studies is still being developed.

For this research, an ecological model was developed based on several models presented in the literature. This model demonstrates the complexity of the interactions which can be examined in an ecological framework, including interactions between three subsystems, the physical environment, the social environments, and the individual. In addition, by recognizing that local environments are a part of broader "macro-environments", the model allows for the incorporation of political and economic variables into ecological analyses of the health/sickness process. Because of the complexity of ecological models, most research that uses such a framework chooses to look at only a part of the system, while remaining aware of the many ecosystemic variables involved in the interaction (McElroy and Townsend 1989:20).

In terms of the disease-culture interaction, this model allows for examination of the interaction of the physical and social environments and disease. Most medical ecological studies have examined this interaction. In addition, the model allows for the

examination of the effect of disease on human populations and behaviour, an area which the literature review indicates is still being conceptualized. Finally, the model allows for incorporation of ethnomedical data into an ecological study as recommended by Alland (1966:48) and Fabrega (1972:206), who suggest that ecological analysis of disease should include factors such as the Native perception of the disease experience and individual coping responses.

Using the ecological framework and the model presented above, this research examines tuberculosis in the Saskatchewan Indians focusing on three interactions. First, by delineating the epidemiology and ecology of tuberculosis in this population, the environmental influence on disease patterns and demographic and biological adaptations to disease are examined. Second, the health status of the population is examined in relation to health services, an environmental variable. Third, in order to examine individual behavioural adaptation to disease, the individual Indians' perspective on the hospitalization and tuberculosis experience is probed. Analysis of broader political-economic influences on health and the cultural component of the model is beyond the scope of the present research. Several areas in which cultural adaptation to disease may be examined are presented in Chapter 8.

3. LITERATURE REVIEW

3.1 Introduction

The literature reviewed for this study included studies of tuberculosis in Native North American populations in order to elicit a comparative basis for the Saskatchewan epidemiological experience; to determine what is known of the ecology of tuberculosis in this population; and to demonstrate the need for, and relevance of, the current study.¹ Ecologically oriented studies of the relationships between the infectious illnesses and human behaviour are surveyed to illustrate the complexity of the interactions examined within an ecological orientation. Most studies of infectious illnesses focuses on the demographic effects of massive population decline. The preceding analysis of tuberculosis in Saskatchewan, however, studies not the earlier period of massive depopulation but the later period in which tuberculosis was endemic and hospitalization of tuberculosis patients became the standard. Therefore, literature that focused on the effects of tuberculosis hospitalization on individuals and human populations is also examined.

3.2 Tuberculosis in Native North American populations

Tuberculosis in Native North American populations was reviewed in order to determine current knowledge regarding the epidemiology and ecology of tuberculosis in this population. The purpose of this review is to put the Saskatchewan experience into its North American context, and to demonstrate the relevance of the present study in light of a paucity of similar comprehensive studies.

As early as the 1880s, the epidemiology of tuberculosis among Native North

¹ In a 1989 symposium on Plains Indian historical demography and health it was suggested that detailed analysis of historical population dynamics and epidemiology remained to be done for the Plains area (Campbell 1989:i).

Americans was examined by Dr. Washington Matthews. Matthews (1886 & 1888) compared tuberculosis mortality in three populations. He discovered that the mortality rate among the Indians was much higher than among Europeans or Africans in the United States, and questioned; "To what particular cause or causes is this high rate of mortality among the Indians especially due" (Matthews 1886:234). What was essentially an environmental explanation emerged from his research. The factors considered in his explanation included the populations' disease-history with respect to tuberculosis (how long tuberculosis had been in this population), and factors of climatic-environmental change. Matthews concludes that "consumption increases among Indians under the influence of civilization" (Matthews 1886:240).

Based on mortality statistics from the five most afflicted American Indian tribes, Hrdlicka (1909) attributed the high rates of tuberculosis in these groups to: poorly ventilated housing; visiting and interaction between healthy and afflicted individuals; malnutrition; and lower racial immunity.

Prior to, during, and following the time of the epidemic in Saskatchewan, tuberculosis was widespread throughout Native North America. The most complete statistical summary of tuberculosis in North America comes from Alaska because of the presence of the United States Public Health Service.

Arriving in Alaska in 1931, F.S. Fellows found that although deaths had been recorded for several years, no statistics for the various diseases had been compiled or analyzed. For the period 1926 to 1930, Fellows (1934) assembled these data for the Native population, including Indians and Inuit, and for the non-native population of the Alaskan territories. Fellows (1934:293) found that tuberculosis was the most common cause of mortality in Alaska with a death rate from 1926-30 of 655 per 100,000 among the Natives, compared to a rate of 56 per 100,000 in the non-native population. In addition, he found that in the Native population, 36% of the deaths in this time period

were from tuberculosis, compared to 4% in the non-native population, where the leading causes of death were accidents and heart diseases. Fellows cautioned that the rates for the Natives likely reflected under-reporting.

The historical context of the Alaskan tuberculosis experience, one of key elements in examining the ecology of disease was first examined by Aronson (1940). This paper outlined the history of tuberculosis in Alaska beginning with the arrival of the "new" infectious diseases among the Indian and Inuit populations. There existed no evidence that tuberculosis was present in this population prior to contact, however many of the early Russian explorers died of consumption, and by 1814, tuberculosis was one of the most common diseases among the Natives. It remained so for the next 150 years. "There is no doubt that tuberculosis has been and is at the present time the most common cause of death among the natives of Alaska" (Aronson 1940:32). Among the Natives of Alaska, tuberculosis never reached the epidemic proportions that smallpox did, however, it "has nevertheless taken a greater toll of human lives since its probable introduction by the white man more than a century ago" (Aronson 1940:32).

At the turn of the century, Petroff (1898) suggested that high mortality and morbidity from tuberculosis in the Alaskan Native population was due to the Natives insufficient clothing, and their practice of sleeping in cold nooks with insufficient covering. Likely favouring the transmission of the disease in early days was the custom of a wife swallowing the expectoration of their sick husbands. The second leading cause of death in 1898 was reported as scrofula, manifested as malignant ulcerations resulting in large disfiguring scars (glandular tuberculosis). In terms of the Natives response to tuberculosis Petroff (1898:229) suggests that: "The natives were apathetic about the condition, which was aggravated by a lack of care" (Petroff 1898:229 as cited in Aronson 1940:32).

More recently, Fortune (1989) examined the health of the Alaskan Natives from before contact through to the turn of the twentieth century. Basing his examination on

the written documents of explorers and missionaries, Fortune (1989:256-258) suggests that tuberculosis was likely introduced to the Alaskan territory by Russian explorers as early as 1770 and that it rapidly became widespread wherever the Russians established their bases of operations. It was in the latter third of the nineteenth century, that tuberculosis spread in "ever-widening circles as more and more Native people came into regular contact with the thousands of Americans, Europeans, and Asians who swarmed into Alaska to seek their fortunes" (Fortune 1989:259). By 1900, tuberculosis was rampant, however, in the first five decades of the twentieth century, "the disease was to increase yet further and even pose a serious threat to the survival of the Alaska Native peoples" (Fortune 1989:264).

Blomquist and Weiss (1953) examined tuberculosis in Alaska into the 1950s, and found that clinical tuberculosis and the epidemiology of tuberculosis in this population did not differ significantly from the rest of the United States. Where Alaska differed was in the intensity of infection in certain populations; and in the difficulties in administering a tuberculosis care program in such a large sparsely populated area. These differences were suggested to stem from the unique population distribution in Alaska and what the authors referred to as "the primitive way of life we find among the native groups" (Blomquist and Weiss 1953:46).

In the 1950s, the mortality rate from tuberculosis in the Indian population in Alaska was higher than that recorded earlier by Fellows (1934) at 662 per 100,000; while in the non-Indian population it had declined to 37.5 per 100,000. These rates suggest that Fellows (1934) cautionary note about under-reporting in the 1920s was accurate. To understand the continuing high tuberculosis death rates in this population, Blomquist and Weiss (1953) examined regional differences in mortality patterns and morbidity data. The non-Indian population comprised the bulk of the population living in the area of lowest infection. In terms of morbidity, the authors recorded a prevalence of 675 per

100,000 for the Indian population compared to a rate of 33 per 100,000 for the non-Indian population (Blomquist and Weiss 1953:48).

Weiss (1953) focused on the infectivity of the Alaskan populations. By examining the results of tuberculin tests of Inuit, Indian, Aleut, and non-native children he found that infectivity ranged, in the 5 to 8 years age category, from 89% among a large group of Inuit, to 65% among the Inuit and Indians of the interior, to 22% among the Indians of the southern panhandle. Infectivity rates among the non-Native children were less than 6% (Weiss 1953:27).

In Alaska, in 1952, the tuberculosis mortality rate for Alaskan Aleuts, Inuit and Indians exceeded 500 per 100,000. By 1959, just seven years later, this rate had dropped to 54 per 100,000. In 1955 the maximum number of beds for tuberculous Natives was available, all of these were utilized in a mass anti-tuberculosis campaign. By 1958, three years later, only one third of these beds were required (Comstock and Philip 1961:22). The authors attribute this dramatic decrease in tuberculosis mortality in the Alaskan Natives to the vigorous anti-tuberculosis campaign with aggressive case finding, isolation and treatment in sanatoria. In addition they suggest that a number of factors contributed to the decline in tuberculosis including: improved standards of living, social, and economic conditions; increased understanding of tuberculosis transmission through education; and the increased cooperation of the population in all phases of the tuberculosis control program. Preventive BCG vaccination played only a minor role in the decline of tuberculosis since only a small segment of the population received the vaccination in a mass campaign in 1949-51 (Comstock and Philip 1961:23-24).

Despite this wealth of published statistical data on tuberculosis in Alaska, most authors do not offer any detailed analysis of the geographical and population differences in tuberculosis rates. They do, however, suggest that specific control efforts would not be effective (except in the area of low infection which consisted of mainly non-native

residents) until living conditions were improved in the two areas of high and medium infection (Blomquist and Weiss 1953:49). This lack of analysis of the statistics is confirmed by Comstock and Porter (1959:621) who indicate that little is known about the epidemiological aspects of tuberculosis among the Native population examined.

Ferguson (1928) remains the most complete, and extensive study of the epidemiology and ecology of Indian tuberculosis in North America. Ferguson (1928) traced the tuberculosis epidemic in the Saskatchewan Indians from its inception in 1880 in order to determine what factors contributed to their high death rates. This research identified a number of factors which contributed to the course of the epidemic among the Indians including: the moral and physical weakening of the Indians resulting from the introduction of the horse, firearms and liquor; the exchange of traditional garments for the blanket; the extermination of the buffalo and beaver; the concentration of populations on reserves; the change of housing, and of food; the concentration of children in boarding schools; the change of occupation from hunting to agriculture; and depression precipitated by conquest; dependence on Government rations for food; and the failure of their gods and even Christian religions to protect them (Ferguson 1928:30-31).

Contemporaneous to Ferguson's examination of Indian tuberculosis in Saskatchewan, surveys were also being conducted in other Canadian provinces. In British Columbia, a study of the geographical distribution of tuberculosis was undertaken in the summers of 1926 and 1927 for the Indian Department, as part of a larger Indian health survey. The findings suggest that despite differences in climate, occupation, history and race of the various Indian groups examined in the province "none of these differences, however striking, have found to yield corresponding differences in the incidence or outcome of human tuberculosis in these groups" (CTAB 1928 6(3):2).

In Manitoba several health problems in the Natives were recognized, however tuberculosis was by far the most acute (Stone, 1925). Propagated by a comment by Dr.

Wodehouse in which he suggested that the "tuberculosis death rate in Manitoba is higher than that of Ontario, and much higher than that of Saskatchewan", Walton (1932:2) examined death records in a study of the racial incidence of tuberculosis in the province. He found, that the "Canadian-born", representing 65% of the non-Indian population, accounted for 49% of the tuberculosis deaths, and that 31% of the tuberculosis deaths were Treaty Indians, who made up a mere 2.1% of the total population. In terms of mortality rates, for the year 1932, the Indian rate was 820 per 100,000 and the non-Indian rate was 33.4 per 100,000 (Walton 1932:12). Walton noted that records of Indian deaths were incomplete until the late 1920s when the provincial department became responsible for the collection of vital statistics. (A similar problem was encountered in using Saskatchewan vital statistics from prior to 1930). Walton also noted that 69% of the non-Indian deaths, as compared to 10% of the Indian deaths, occurred in institutions (Walton 1932:18). Walton did not analyze the cause of the higher death rate in the Indian population.

A study of the causes of the high incidence of tuberculosis in the provincial Metis population in Alberta was undertaken in the early 1960s (Card et al, 1963). Although statistical data are incomplete, this study indicates that in the Metis population a variety of social and economic factors contributed to their tuberculosis experience.

Although studies such as the above were conducted in the other Canadian provinces, none were as extensive as Ferguson's (1928) study tracing the tuberculosis epidemic from its inception in the 1880s, nor were they able to explain the factors contributing to the high death rates in the Indian population in the context of reliable epidemiological data.

Nationally in Canada, statistics on tuberculosis mortality have been collected by the Dominion Bureau of Statistics and the Canadian Tuberculosis Association for over half a century. Separate Indian and non-Indian rates, however, were not calculated until

1944, by which time tuberculosis was endemic in the Indian population and mortality was declining as part of the natural course of the epidemic curve (See Enarson and Grzybowski 1986).

Tuberculosis facts by province as outlined for the year 1944, include separate Indian and non-Indian statistics. The rates for Indian deaths in different provinces are quite variable. For example, in 1944 the tuberculosis death rates for Manitoba and Alberta both exceeded 1,100 per 100,000 according to these data.² The death rate for Prince Edward Island Indians was 752 per 100,000. However this statistic may be somewhat misleading because in P.E.I., in 1944, there were only two Indian tuberculosis deaths in a population of 258 (Canada. Dept. of National Health and Welfare, 1947).

A Department of National Health and Welfare, Research Division publication (1955), presented statistics on tuberculosis deaths for all of Canada, for the Indian and the non-Indian populations, for the years 1926 to 1953. Unfortunately, again, separate data for the Indians were not available until 1944. The numbers indicate that the Indian tuberculosis death rate slowly declined from 1944 to 1953, across Canada. The report also discussed new sanatorium admissions, and the increased number of Indian admissions from 1938 to 1953. Admission increases, however, for one segment of the population (the Indians), likely reflect the increased availability of beds. In 1954, there were finally enough beds available in Canada to accommodate all new Indian cases.

When Health and Welfare Canada became responsible for Indian Medical Services in 1945, Indian vital statistics were collected and published annually. By 1951, tuberculosis was no longer the number one cause of death among the Indians; it ranked number two behind acute respiratory infection. In that same year it ranked 10th in the non-Indian population. By 1956, tuberculosis had dropped to the seventh leading cause of death in the Indian population, behind acute respiratory infections, accidents, diseases

² In Saskatchewan, in 1944, the rate was just over 500 per 100,000.

of infancy, chronic heart disease, senility and ill defined causes, and, neoplasms. In 1956 tuberculosis ranked 14th in the non-Indian population and the leading causes were coronary heart disease, neoplasms, vascular CNS lesions, accidents, and diseases of infancy.

These government publications delineate mortality rates for Indian tuberculosis in Canada from 1944 on, however, they are merely collections of statistics, and again little analysis is applied to the data.

Two more recent publications examine tuberculosis among the Indians of Canada. A report submitted to the Royal Commission on Health Services (Wherrett 1965) presented statistics on mortality and the incidence of tuberculosis and hospital admissions and readmissions for Canada by province. These data are for the total Canadian population, however, they do demonstrate the increasing incidence of new cases of tuberculosis reported and sanatorium admissions from about 1941 to 1950 which reflects the active anti-tuberculosis work initiated among the Native population during this time period. The report also discussed the special problem in tuberculosis control for Canadian Indians and Inuit. Wherrett (1965:57) suggests that the special Indian and Inuit situation with regards to tuberculosis is the result of several interrelated factors. These include a lack of natural resistance to tuberculosis in these populations; living in crowded one-room dwellings providing optimum conditions for the spread of infection; general dietary deficiencies; a lack of education barring them from avenues of learning regarding tuberculosis prevention; and isolation on reserves with little in the way of medical services except emergency care. The report also points out that the government assumed that Indians would not accept treatment or feel at home in white man's sanatoria, and that prevention was not taken seriously as government policy for the Indians.

Wherrett (1977) outlined the history of the battle against tuberculosis waged throughout Canada. This book incorporated both a chapter on "Tuberculosis in Native

Races", summarizing the tuberculosis epidemic among Canada's Indian population, and provided an appendix showing the decline in Canadian Indian tuberculosis mortality from 1930 to 1965 (See Wherrett 1977:252). This summary, an analysis of the above mentioned government published statistics, as well as material taken from Ferguson (1928), discussed several factors in the everyday life of the Indians which predisposed them to high mortality from tuberculosis. These include: the fact that they had no previous experience with the disease and therefore no built up immunity to it; their crowded living conditions in which isolation of the sick was impossible, even if its necessity had been recognized; their changed diet and malnutrition due to a rationed existence; a lack of sanitation, resulting from inexperience with methods for maintaining cleanliness within a fixed area; and the scattered, remote location of many reserves making it difficult to bring them medical assistance and effective preventive programs (Wherrett 1977:99-100). Wherrett (1977:105) points out that the spread of, and high mortality from, tuberculosis was also exacerbated by putting Indian children in residential schools. These schools were badly ventilated and overcrowded, and children could not get a balanced diet. From early statistics, in the first decade of this century, the death rate from tuberculosis among Indian school children was 8000 per 100,000. By the late 1920s regulations recommended that no tuberculous child be admitted to school (Wherrett 1977:107).

In the 1980s tuberculosis morbidity among Indians remained a health problem. Enarson and Grzybowski (1986), analyzed the incidence of active tuberculosis, reported between 1970 and 1981, in three Canadian ethnic groups; the Inuit, the Registered Indians, and others, mainly of European origin. The authors found that tuberculosis morbidity continued to be unevenly distributed in the Canadian population. Rates were fairly low in the last group, which represented 82% of the Canadian population. However, among the Indians and the Inuit the morbidity rates still exceeded the national

rates by 24 and 16 times respectively. Enarson and Grzybowski (1986:1151) felt that the decline in tuberculosis rates among the Inuit is a success story that continues today, and suggest that at the present rate of decline, tuberculosis will be eliminated as a significant disease in the Inuit population by the end of the century. In contrast with the Inuit, the present situation among Registered Indians is less than satisfactory. Their data illustrate a declining rate, but a much slower decline "perhaps no greater than can be expected from the natural decline of tuberculosis in this phase of the epidemic" (Enarson and Grzybowski 1986:1151). Dr. V. Hoepfner, Director of Tuberculosis Control for the Saskatchewan Anti-Tuberculosis League, reinforced this concern when he suggested in 1987 that the present rate of decline "is a natural epidemiological phenomenon which is uninfluenced by any intervention" (Driver 1987:52). The persistence of tuberculosis in the Indian population exists because many conditions that exacerbate tuberculosis transmission still exist today.

Today tuberculosis is treated on an outpatient basis. For several reasons, infected individuals are not diagnosed early enough in the course of their illness and continue living in extended family groups providing opportunity to spread the illness to their family. Because of conflicting reports on its effectiveness, protection from infection by preventive BCG vaccination has been discontinued by the federal Government responsible for the Registered Indians. Also contributing to the continued transmission of tuberculosis, living conditions continue to be poor in most Native communities. Running water and sanitation are still not available to everyone, and houses designed for one family are often shared. In terms of treatment, in many areas of the province, because of the mildness of the illness or a lack of obvious symptoms, compliance is a problem, though existing services have designed unique programs to get the patients to take their medication (Dr. Greg Horseman, Director of Tuberculosis Control for the Province of Saskatchewan, personal communication, June 1990).

This review broadly illustrates the temporal and geographical extent of the tuberculosis problem in Native North America. The literature is indicative of epidemiological studies of tuberculosis. It suggests that although knowledge regarding the history of tuberculosis in these indigenous populations is available from a variety of sources, it is largely limited to presentations of statistical data. The epidemiology and ecology of tuberculosis in this particular anthropological population is not dealt with in any detail except in Ferguson's (1928) presentation. As recently as 1989, regarding Plains Indian culture and health, Campbell (1989:i) suggested that for the Plains area detailed analysis of historical population dynamics and epidemiology remains to be done.

The following review examines the anthropological literature dealing with the relationship and interaction between disease and human populations from an ecological perspective. It was undertaken in order to elicit the use of the ecological perspective in medical anthropology in examining relationships between the infectious illnesses and human behaviour, and to delineate and illustrate the complexity of the interactions examined within an ecological orientation.

3.3 Ecological Studies of the infectious illnesses

In examining the relationship between disease and human populations, the holistic approach in medical anthropology attempts to account for as many of the variables in the ecological model as possible. Analysis of all of the variables, however, is difficult conceptually and not always possible within the feasibility of a research design. Because of this constraint, most ecologically-oriented studies choose to examine only a few variables (McElroy and Townsend 1989:20).

Studies of the correlation between cultural patterns and disease occurrence and distribution have been the mainstay of anthropological studies in medical ecology. The classic examples include the examination of the relationship between culture,

environment and a specific disease leading to the discovery of the "cultural" etiology of kuru in an isolated area of the New Guinea Highlands (Fisher and Fisher 1961); a study of hypertension in urban and rural Zulus, in an attempt to relate social factors of stress and stability to the etiology of hypertension (Scotch 1960); and the study of the interaction of human technology and the environment related to the occurrence of malaria in West Africa (Wisensfeld 1967). In North America, the Stirling County Studies in Nova Scotia (Leighton and Hughes 1961) examined the relationship between sociocultural factors and psychiatric disorders (Scotch 1963:44-46; Armelagos and McArdle 1975:2).

Fabrega (1972:206) suggests that within an ecological framework the influence of culture on disease patterns may be examined; as may the behavioural concomitant of disease. Alland (1970), Armelagos et al (1978), and Moore et al (1980) all indicate that their ecological models can be used to examine the effects of disease and health practices on behaviour and culture. Although epidemiological studies dealing with the prevalence and distribution of infectious diseases in isolated groups are numerous, most of these studies do not employ a cultural perspective nor do they focus on the behavioural concomitant of disease (Fabrega 1972:205). For example, Bruch et al (1963) illustrates several of the behavioural practices that affect the prevalence and distribution of diarrhoeal diseases in the Guatemalan highlands. However, the whole dimension of the consequences of disease, including Native perceptions and coping responses of villagers, is not considered (Fabrega 1972:206). Studies of the impact of disease on behaviour and culture are not as common.

Studies which examine the effects of disease on human populations, within an ecological frame of reference focus on the infectious illnesses. Those reviewed are of two types; historical studies of the great epidemics in Western culture such as the Black Death in 14th century Europe; and studies of infectious illnesses in Amerindian groups

based on historical records, paleopathologic evidence and ethnohistoric and ethnographic data.

Examination of the role of the epidemic diseases in human history includes an abundance of well documented literature on the controversy of the role which plague played on the economic, political and social fabric of Europe (Armelagos et al 1978:80).

Gottfried (1983) used an environmental approach in his analysis of the plague and its role in European history. He postulates that the Black Death and subsequent epidemics in the ensuing 200 years constituted the greatest natural disaster in European history. Focusing on the immediate consequences of massive population decline,³ Gottfried (1983) discusses social-psychological changes; the decline of the institutionalized religions; the crisis faced by the nobility in regard to inheritance; the increased living standards for the peasants; and changes to the existing medical system. As a result of continued epidemics until the end of the 15th century, Gottfried (1983) suggests that the chronic drain on the population perpetuated changes in the economy, the environment, the land tenure system, the constitutional framework, the educational system, and in technology.

In a noble attempt to rewrite the history of the world taking into account the role of disease, McNeill (1976) makes several speculations regarding the psychological, economic and cultural consequences of Europe's encounter with the plague in the 14th and subsequent centuries. He suggests that at the psychological and cultural levels reactions were conspicuous and varied. For example, when an outbreak of plague implanted the fear of imminent death in an entire community, ordinary routines and customary restraints broke down. In the 14th century local panic often provoked bizarre behaviour such as that displayed by the Flagellants who beat each other bloody and

³ The plague epidemic in Europe in the 1300s killed as much as one third of the population (Armelagos et al 1978:80).

attacked the Jews, who were commonly accused of spreading the pestilence. In time, however, McNeill (1976:161-162) suggests that rituals emerged to channel anxiety in socially acceptable ways and many writers of the era portrayed plague as a routine crisis of human life. The economic impact of the Black Death included disruption in wage and price patterns, manpower shortages, and harsh collisions between social classes (McNeill 1976:162). In addition, McNeill (1976:163) suggests that the revival of certain fatalist pagan philosophies were possible local reactions to the grim realities of the plague. McNeill (1976) also includes a discussion of the effects of the epidemics in the Americas.

Zinsser (1965) focused on the decisive impact that disease, and in particular typhus, has had on political and military history; "The difficulty is not to find evidence, but to select from the dreadful abundance" (Zinsser 1965:113). He suggests that, for example, the outcome of the French Revolution was to a large extent determined by dysentery. In 1792, when 42,000 Prussian and Austrian troops were marching against the armies of the revolution, dysentery reduced their ranks by 12,000; the remainder retreated across the Rhine (Zinsser 1965:118). In another example, he suggests that the establishment of the Haitian Republic was engendered by yellow fever. Although the local Negro army was smaller and less organized than Napoleon's 25,000 men, yellow fever disorganized the invaders, and only 3,000 were left to evacuate the island in 1803 (Zinsser 1965:119).

In an interesting review of American history, Simpson (1954) suggests that not only was the American continent conquered by disease, but that disease also played an important role in the history of the invaders: "Smallpox, pneumonia, diphtheria, tuberculosis and similar infections killed far more Indians than swords or rifles ever did, but it would be utterly inaccurate to imply that disease held no terror for the invader as well as the native" (Simpson 1954:680). For example, Simpson suggests that after the defeat to yellow fever in Haiti, Napoleon changed his mind about a colonial empire in

America and hastily consummated the most gigantic real-estate transaction in history when he sold the Louisiana territory (Simpson 1954:681-683).

In examining cholera in Canada in the nineteenth century, Bilson (1980) makes several suggestions regarding the role of illness in early Canadian history. Between 1832 and 1871 successive cholera epidemics claimed an estimate 20,000 lives in Canada (Bilson 1980:166). Anticipation of the arrival of the epidemic of cholera in 1832 created fear and apprehension, as measured by an increase in religious activity. In the year of the epidemic the Methodists reported 3652 new members, a three-fold increase over the previous year (Bilson 1980:63). Because of the influx of immigrants in this time period, the demographic impact of the epidemics is not clear. Some towns such as Kingston suffered from economic hardship and business failure as skilled artisans and businessmen died as a result of cholera. The social costs of successive epidemics included many immigrants arriving in a new country left to find a new life without husbands and fathers; and some immigrant children finding themselves orphaned in a strange land (Bilson 1980:167). In addition, the epidemic was a highly emotional experience for the people who lived through it and saw their family and friends die. Bilson (1980) suggests that emotional responses were expressed through the cliches in which the epidemic was described.

A town or city suffering the disease was usually described as a place of empty streets, where nothing was to be seen but the cholera carts carrying the sick to hospital and the dead to burial. Little could be heard but the sound of footsteps echoing from the walls as the doctor or priest hurried to the bedside of the sick and dying (Bilson 1980:168).

In examining the relationship between epidemic disease and human populations from an ecological perspective, all of these studies illustrate the pervasive influence that epidemic illness may have had on human history. Fisher (1969:133) suggests that the studies of the European epidemics demonstrate that the discernable social effects of plague and other diseases are broad rather than specific.

Although historical studies of the great epidemics provide important information on these broad social and economic responses to these catastrophic events, additional information on the effect of the epidemics in specific culture groups, such as the Indians of the Americas, is required. We also need to know more about the impact of waves of epidemics on small populations and the impact of less catastrophic and endemic diseases on local population structure, technology, social organization and ideology (Armstrong et al 1978:80). The following section examines ecologically oriented studies, based mainly on historical and ethnohistorical data, of epidemics in Amerindian populations.

Duffy (1951) examined the role of epidemic illness in the conquest of North America by reconstructing a chronology of smallpox epidemics in eastern North America from 1633 to 1765. Although not the main objective of his paper, Duffy (1951) discusses several effects of the epidemics on the Indian populations. For example, he suggests that at the time of the first epidemic in 1633, the Indians in North America were a "fertile field for conquest" and they "died in droves huddled in their camps". When experience made them wiser, they fled the epidemics in fear (Duffy 1951:327). Among the Hurons, in 1636, terror was universal. "Everywhere was heard the wail of sick and dying children" and "such was the despondency and dismay, that suicides became frequent" (Duffy

1951:328). Among the Iroquois in 1662-63, smallpox wrought havoc, carrying off great numbers of men, women and children, and "as a result their villages are nearly deserted, and their fields are only half-tilled" (Jesuit Relations as cited in Duffy 1951:329). In discussing the effects of the epidemics on wars, Duffy (1951:331) suggests that "on more than one occasion well-planned military campaigns were thwarted by this unseen enemy".

Crosby (1967 and 1976) also examined the conquest of the Americas by the epidemic diseases focusing on reconstructing the epidemic chronology; reviewing depopulation estimates; and delineating the personal, cultural and environmental factors contributing to high epidemic mortality. Crosby (1967) highlights the political consequences of the epidemic in Central America. He suggests that "The pandemic not only killed great numbers in the Indian empires, but also affected their power structures, striking down their leaders and disrupting the processes by which they were normally replaced....in Peru the epidemic of the 1520s was a stunning blow to the very nerve center of Incan society, throwing that society into a self-destructive convulsion" (Crosby 1967:334-335).

Crosby (1976) examined the factors contributing the high epidemic mortality among the Amerindians, focusing on both the nature of the diseases and individuals and societies reactions to threats of epidemic death (Crosby 1976:293). In terms of the nature of the disease, epidemics which have the reputation of being the Indian killers, smallpox, measles, influenza, tuberculosis and others, tend to carry off a disproportionately large number of people from ages 15-40, those in the prime of their lives who are responsible for vital societal functions of food procurement, procreation and defense (Crosby 1976:294). In addition, virgin-soil epidemics, those which the

population has no built up resistance to, tend to afflict the entire population, so that nearly all are sick at once:

The fire goes out and the cold creeps in; the sick, whom a bit of food and a cup of water might save, die of hunger and the dehydration of fever; the seed remains above the ground as the best season for planting passes, or there is no one well enough to harvest the crop before the frost (Crosby 1976:296).

In terms of the Indians' reactions to epidemics, Crosby (1976:296) suggests that these too had a decisive influence on the death rate. He suggests that traditional treatments were not effective against the acute epidemics and they may have been dangerous, such as the swift transfer of the patient from the sweat lodge into a frigid lake. In addition, the Indians had no conception of contagion and did not quarantine their sick traditionally, nor did they readily accept this strategy until after successive disasters. Ignorance of the dangers of infection was fatal, but knowledge could also be fatal when it created terror, resulting in fatalism or frenzied destructive behaviour. In the epidemic of 1738, many Cherokees killed themselves in horror of permanent disfigurement, and, in 1802, many Omaha carried their panic to an extreme, by burning their villages and by putting their wives and children to death (Crosby 1976:296-298).

Hopkins (1983) examined the impact of smallpox in the New World beginning with its introduction in 1507 in Central America. In addition to examining the political repercussions of the early epidemics on the great empires of Central and South America, he examines the economic impact of the destruction of the indigenous population, suggesting that because the Indians were insufficient in numbers, there were increased

demands for African slave labour (Hopkins 1983:216). He also makes reference to several of the factors that may have spread the epidemics such as religious ceremonies which guaranteed that everyone in the community was infected (Hopkins 1983:219).

In the area north of Mexico, before the early 17th century, smallpox and the other epidemics were unknown among the indigenous population. However, once they arrived, they took an immense toll. Several authors estimate population losses averaging from 50-67% within different Indian groups (Marshall 1981:74 In Hader 1986:23). Hopkins' (1983) discussion of smallpox in the area north of Mexico highlights the widespread epidemic of 1836-40, which affected the Indians of the entire North American continent west of the Mississippi, from Texas to Alaska (Hopkins 1983:271). An unsigned letter originating in New Orleans in 1838, summarized the impact of this epidemic among the Indians:

The destroying angel has visited the unfortunate sons of the wilderness with terrors never before known, and has converted the extensive hunting grounds, as well as the peaceful settlements, of those tribes, into desolate and boundless cemeteries...the few survivors, in mute despair, throw themselves on the pity of the Whites...in whatever direction we go, we see nothing but melancholy wrecks of human life. The tents are still standing on every hill, but no rising smoke announces the presence of human beings, and no sound but the croaking of the raven and the howling of the wolf interrupt the fearful silence (Stearn and Stearn 1945:89-90).

Thornton (1987) discusses American history from 1492 to the turn of the twentieth century. The book focuses on reconstructing the chronology of the early epidemic illnesses and their impact on Amerindian population demography and includes a short appendix on the Canadian experience with the early infectious illnesses.

These historical studies of the infectious illnesses in Native American populations utilize, for the most part, an ecological frame of reference in examining the epidemics. Most, however, focus on reconstructing disease history, and emphasizing the cultural factors modifying epidemics they delineate the demographic effect of the epidemic illnesses perpetuated by rapid depopulation. Few studies go beyond quantifiable, measurable parameters of epidemiology, demography and population dynamics, to suggest the impact that these epidemics have had on human lifeways (Ray 1981:45). Several authors make some mention of the influence on culture and behaviour, (See Aronson 1940, Young 1979) but usually in the context of other studies, and these observations are seldom followed-up. Campbell (1989:x) suggests that studies that describe disease occurrences and discuss mortality estimates represent not an end in themselves, but an important step towards locating disease in time and space. The task remains to take the compiled data and apply it within a theoretical context to understand epidemiological patterns and societal adaptations.

Systematic analyses of the disease-host interaction within a societal context (Campbell 1989:x), and of the impact of illness on Native North American lifeways, are presented in Ewers (1973), regarding the Indian populations and cultures of Texas; in Dobyns (1983) focusing on Native populations in eastern North America; by Shepard Krech III in his examination of the influences of diseases on Arctic Drainage Lowland Dene in the early 19th century, and; in Taylor (1977) who focuses his analysis of the sociocultural effects of epidemics on the Northern Plains between 1734 and 1840.

Utilizing an anthropological framework, Ewers (1973:104) proposes, that in addition to the epidemics being responsible for the depopulation of the Indians of Texas,

epidemic depopulation caused significant cultural changes in warfare, political and social organization, and religious beliefs and practices. Taylor (1977) focuses on sociocultural change on the Northern Plains evoked by epidemic depopulation including temporary sociocultural disruptions such as the chaos immediately following an epidemic, demographic and territorial shifts, and permanent sociocultural change such as interethnic amalgamations. Dobyns (1983) analysis highlights population migration, settlement amalgamation and simplification of social structure as an adaptation to population decimation (Hader 1986:25). In examining the effect of epidemic illnesses on the Arctic Drainage Lowland Dene from 1800-1830, Krech (1978:710,724) discusses the immediate economic consequences of epidemics in terms of the fur trade, and he suggests that a variety of post-contact factors, including high epidemic mortality, conditioned a change from matri-organization to bilateral and bilocal organization.

The cultural changes perpetuated by these early epidemics in North American Indian populations, as discussed in the above publications, are amalgamated in Hader (1986). This study, based on a review of the literature, examined the cultural effects of infectious illnesses, particularly smallpox, on the Indigenous populations of North America once introduced. The paper highlights the impact of the epidemic in six areas: the immediate and prolonged psychological ramifications; short and long-term economic changes; population movements, including settlement abandonment, migrations, and amalgamations; social system and political modifications and reorganizations; changes to religious beliefs and practices; and changes in population interactions (Hader 1986:25-30). In an examination of the ecology of the Cree in Canada, Fisher (1969:133) cautions that these effects should not be considered a direct acculturative force, rather, the

epidemics should be considered another, albeit novel, ecological pressure. Campbell (1989:x) suggests that studies, such as Ewers (1973) and Taylor (1977), are significant contributions, not so much for the answers they provide regarding the impact of illness, but for the questions which they generate.

Kunstadter (1972) and Armelagos and McArdle (1975) discuss in general terms the potential impact of epidemic illness on small populations. Kunstadter (1972:315) suggests that the epidemic illnesses as experienced in different local populations likely had consistent effects on demographic and social structure, however, these would vary depending on the character of the particular disease involved including its mode of transmission, virulence, period of contagion, and so forth. He suggests that if epidemics in small populations were infrequent, such as the early epidemics of smallpox, measles and influenza were which struck every 20-30 years among the American Indians, the epidemics would have an extremely destructive effect because the number of susceptible in the population would be great. As a result, family and village structure would be disrupted, and children might die if their parents died, only for want of care. To substantiate his hypothesis Kunstadter (1972:316-317) draws on his research in a semi-isolated village in Thailand. In 1966, a measles epidemic struck the village. Everyone in the village under the age of 20 became ill, and although no one died, many families had partial crop failures because they were unable to weed their fields while their children were ill. In an epidemic of smallpox, 20 years earlier in the same village, the mortality was high, and many of the deaths were among young children who had no one to care for them when their parents were sick.

In a review of the literature on disease ecology in local populations, Montgomery (1973:35) suggests that Kunstadter's (1972) study relating health levels with economic behaviours represents an interesting and promising problem area for medical anthropology. Montgomery (1973:35) also makes an interesting methodological suggestion: to demonstrate systematic linkages between these subsystems it would be necessary to obtain precise observations of fluctuations in values in one subsystem to be tested for correlation with varying values of health levels in the population

Armelagos and McArdle (1975:5) also examine infectious disease in small populations, and propose a model which allows for the measurement of the effects of epidemic mortality. They suggest that infrequent epidemics in small populations would leave a large part of the population susceptible, and as a result, cultural responses to these diseases would be as important as the genetic ones. In their model, Armelagos and McArdle (1975:5) suggest that analyzing the effect of disease in small population requires methods for evaluating the effects over a long period of time. Because of the flexible nature of the social structure in band societies for example, the authors suggest that some aspects of adaptation to disease are not likely to occur quickly, and the effects of a disease may have long-term repercussions on a population. They make several speculations regarding the possible effects. For example, if a particular disease removed large numbers of adult women, for a population to regain size or stability it would have to increase fertility through decreasing birth spacing. One difficulty with their model is incorporating the effects of morbidity because morbidity, as well as mortality, disrupts social groups, for example through adults not being able to perform their normal functions when ill (Armelagos and McArdle 1975:6-7).

Studies that empirically examine the interplay between environment, culture, population changes and disease mortality and morbidity in small isolated groups, are exemplified by the work of Neel et al (1970). In a study of a measles epidemic among the Yanomamo in South America, Neel et al (1970) discovered that to a large extent the ecological setting, determining the disease agents present, influenced the disease pattern. In addition, secondary factors, including the behaviour of the subjects during the epidemic, accounted for much of the morbidity and mortality associated with the disease (Fabrega 1972:197-198). For example, the reactions of several of the Indians at the prospect of the nearing epidemic had implications for the rate at which the disease spread. Some individuals, on hearing of ill kinsmen, went to visit them, and returned to their villages with demoralizing stories of sickness and death, bringing the disease back with them. Others, who were not yet ill, left their villages to escape the epidemic and carried the disease to unaffected villages (Neel et al 1970:422).

In terms of the effects of illness, in addition to those who became ill and were not be able to fulfil their social obligations, there was a general collapse of village life (Neel et al 1970:427), and among the Yanomamo, this social disruption caused by measles in turn contributed to higher mortality (Armelagos et al 1978:81). In another example from Fiji, similar effects were observed. An epidemic of measles in 1877 led to the collapse of village life and "terror at the mysterious seizure, and the want of commonst aids during illness; there were none to offer drink during the fever, nor food on its subsidence. Thousands were carried off for want of nourishment and care" (Squire, 1877: cited in Neel et al 1970:418).

Since the time of these studies, conducted in the early 1970s, interest in the interaction of disease and behaviour within an ecological framework appears to have waned. In its more recent revival the methodology of ecological analysis in medical anthropology has been fine tuned. This decrease in interest and subsequent change in focus of medical ecology may reflect the methodological difficulties inherent in the complexity of the ecological model. It also appears to reflect the general shifting of emphasis in medical anthropology to the ethnomedical studies spurred by the theoretical work of Kleinman (1978) and others in the late 1970s, and more recently by evolution of a "critical perspective" in medical anthropology which addresses the limitations of micro-ecological approaches in explaining health/sickness dynamics (see Baer et al, 1986).

Today, McElroy and Townsend (1989) in presenting their ecological model, recommend that ecologically oriented researchers focus on the more measurable, or quantifiable aspects of the disease-culture interaction in the model, as recommended by Montgomery (1973); leaving qualitative analysis, more in the anthropological tradition, to ethnomedical researchers. In reviewing several studies of change in contact situations which use a medical-ecological approach, McElroy and Townsend (1989:312), delineate four areas of emphasis for research in which quantifiable variables are found in cultural subsystems. These include the demographic subsystem, the epidemiological subsystem, the nutritional subsystem, and the health resources subsystem.

Regarding the short and long term effects of endemic or chronic illness on populations, reference to the effect that tuberculosis can have on culture has appeared in the anthropological and sociological literature. Hodgson (1982:508-509) suggests that

Native people who were sent to tuberculosis sanatoria were faced with a total "institution" with no precedent in their own culture. They were sent to a place from which many people did not return and were forced to live in a world in which the language, the ethos, food and lifestyle were foreign to them. As a result, Hodgson (1982) suggests that among most Native groups in Canada, there is still a fear of medical institutions. In addition, because so many Natives were institutionalized, the disruption to family and community life that occurred throughout the Native groups in Canada, cannot be gauged. The author recommends that further studies are required to discover the ramifications of the Native tuberculosis experience on subsequent behaviour (Hodgson 1982:509).

Williamson (1968) examined the factors contributing to sociocultural change in the Arctic, suggesting that the influence of tuberculosis in terms of cultural change in the Inuit has been overlooked. He points out that the fear of tuberculosis was an important factor which has not been sufficiently stressed in accounting for Inuit in-migration. He also discusses the effects of long-term hospitalization and chronic illness among the Inuit. He suggests that the evacuation of large numbers of people to hospitals in the south profoundly affected the involved families, and the acculturative experience of the hospitalization period in the south was often very significant: "Whether it is the hunter or his wife who is sent out, the whole family is incapacitated and the tendency had been for the deprived family to depend more heavily on the social and material resources of the settlement" (Williamson 1968:488). In addition to the effects of evacuation and hospitalization, he suggests that "even where someone returning from the hospital still wishes to pursue the life on the land, there are many instances where the residual effects

of their illness makes this impossible" (Williamson 1968:488). Unfortunately none of these perceptive observations have been followed up.

The research conducted among the Kuskowagamiut of Alaska is the most complete study to date on the influence of disease on one aspect of culture. Mason (1972 and 1974), examined the adaptive significance of disease processes in human evolution suggesting that the effects of biological factors on cultural development in an acculturation context are clearly evident. In terms of tuberculosis among the Kuskowagamiut, Mason suggests that "Before its eventual containment, tuberculosis produced more widespread suffering and debilitation than those viral epidemics which struck before" (Mason 1974:41).

Using a variety of sources, including health department statistical data, information from a health survey conducted by the researcher among 35 adult men and their families, and case history information on individual's disease and post-treatment experiences, Mason (1974:44) discovered the immense role that hospital evacuation played the lives of his subjects and the incredible amount of disability in one village. In this one village alone, between 1952 and 1970, of 39 adult males, only seven had not been hospitalized, of these six were under 40 years of age; nineteen (60%) were hospitalized for active tuberculosis. The women fared better. Twenty-three of 32 had been admitted in this time period, 12 for active tuberculosis.

In Mason's study the effects of chronic tuberculosis and evacuation for treatment on social organization and economic productivity were first inferred from demographic information on the population. The median population age for males dropped by 6.2 years between 1910 and 1930, increasing the size of the dependent population, and

decreasing the size of the economically productive adult males in the population (Mason 1974:42). To test the hypothesis regarding loss of economic productivity, Mason (1974) looked for data on the economic adjustments that this population may have made to the presence of illness. In examining a group of Alaskan fishermen, the research focuses on the relationship between disability due to chronic tuberculosis and economic productivity. Although Mason's work provides a wealth of qualitative data, in his analysis Mason (1974:49) sought quantitative proof of the hypotheses. He found statistical correlations that suggested, but did not demonstrate, the intervening influence of physical disability in the gradual shift from subsistence to cash-oriented modes of livelihood. Other factors of modernization also contributed to this shift, including better educational opportunities, the availability of vocational training programs and welfare and unemployment funds, and an increase in available jobs (Mason 1974:50). The author concluded that the introduction of disease into Alaska disrupted traditional modes of livelihood and encouraged participation in the imported cash economy (Mason 1972).

Studies that suggest illness and subsequent disability decrease economic productivity have also been conducted in Norway, though not from an anthropological perspective (see for example, Fugelli, 1976). These studies do not suggest, as does Mason (1974), that an alternative mode of livelihood was adopted as a result of that prolonged disability from illnesses such as tuberculosis, but they do demonstrate the extent of the disability in a culture, and suggest that adaptive changes are required.

Studies that examine the effect of illness, long-term hospitalization and chronic disability from the patient's perspective do not appear in the medical ecological literature. In addition, current work in the area of medical ecology (McElroy and

Townsend 1989:312) actually precludes qualitative analysis from being included in ecological studies, which the authors recommend should focus on quantifiable variables.

In the present study, variables in the quantifiable subsystems as recommended by McElroy and Townsend (1989) are examined within the ecological framework. In addition, qualitative information from the emic perspective of the "people" involved is probed. As Alland (1966:48) recommended, ethnomedical factors should be considered in the ecology of disease. Fabrega (1972:206) noted that the whole dimension of the consequences of disease, beyond demographic analyses, including factors such as of the Native perceptions of the disease experience and individual coping responses, is not generally considered in studies of the ecology of disease. However, examination of this whole area within the context of an ecological study, does provide one way in which the two divergent emphases in medical anthropology, the ecological and the ethnomedical, can be reunited (Armelagos et al 1978:81).

3.4 Summary

The literature reviewed dealt with tuberculosis in Native American populations, the impact of the infectious illnesses on human populations, and studies of the effects of endemic tuberculosis, and tuberculosis hospitalization on culture. The review indicated that most studies of tuberculosis in American Indians focus on disease occurrence and mortality. Besides the pioneering work of Ferguson (1928) little of the ecology of tuberculosis has been discussed since. Although these studies delineate the tuberculosis experience, they merely represent one important step, which Campbell (1989:x) suggests is not an end in itself; we have to take the compiled data and apply it in a theoretical

context to understand epidemiological and societal adaptation.

The literature which addresses this concern with adaptation, mainly focuses on epidemic illnesses and demographic adaptations to depopulation. Those studies which look at cultural effects, including historical studies of the great epidemics in Europe, and studies of Amerindian adaptations to the epidemics (Ewers 1973 and Taylor 1977) suggest in broad terms the potential impact of disease. Fisher (1969:133) cautions, however, that disease is just one of several ecological pressures on populations.

In terms of medical ecological studies of local populations, the literature suggests that although several studies address this area (Montgomery 1973), there is a relative paucity of studies which examine the impact of disease on human populations; those that do, recommend several frameworks, highlighting the quantifiable, measurable variables in the interaction (See for example Armelagos and McArdle 1975). The work done by Neel et al (1970) which examines empirically the interplay between environment, culture, population changes and disease mortality and morbidity in small isolated groups, exemplifies the medical ecological study in local populations. In addition to examining the effect of the physical and social environments on disease, the study also examines the concomitant effects of illness on behaviour.

Although Armelagos et al (1978:80) recommend that medical ecological studies focus on the impact of less catastrophic and endemic diseases on local populations; the effect of endemic or chronic illness on culture and human behaviour is not generally examined in the medical ecology literature. McElroy and Townsend (1989:115) discuss several anthropological studies of individuals coping with chronic disease and adapting to disability. These particular studies are not ecological in orientation. However, they

do focus on adaptation, a key element in ecological analyses, and their inclusion in a publication advocating an ecological framework suggests that such studies can be tied into mainstream medical ecological analyses. They are usually excluded, not because they are conceptually removed from medical ecology, but because, as stated above, most research that uses an ecological framework, due to its complexity, examines only a part of the system (McElroy and Townsend 1989:20). While aware of the many variables involved in the interactions in an ecosystem, ecological research has tended to emphasized broader relationships in the environment and has not focused on the individual level of adaptation.

Hodgson (1982) and Williamson (1968) make several hypotheses regarding these individual and societal adaptations to tuberculosis. These authors suggest that Native people who were sent to tuberculosis sanatoria were faced with a total "institution" with no precedent in their own culture. In addition, Hodgson (1982:508-509) suggests that because so many Natives were institutionalized, the disruption to family and community life that occurred cannot be gauged. Williamson makes some suggestions about the extent of this social disruption. He suggests that the evacuation of large numbers of people to hospitals in the south profoundly affected their families, and the acculturative experience of the hospitalization period was often very significant. While a family member was away the whole family was incapacitated, and Williamson (1968:488) indicates that many deprived families as a result came to depend more heavily on the social and material resources of the settlement. In addition to the effects of evacuation and hospitalization, he suggests that "even where someone returning from the hospital still wishes to pursue the life on the land, there are many instances where the residual

effects of their illness makes this impossible" (Williamson 1968:488).

The only study which examines the impact of tuberculosis on a local population within an ecological framework is Mason (1972 and 1974). But, despite a wealth of ethnographic, qualitative data regarding the impact of chronic illness, Mason's analysis focuses on the more quantifiable parameters relating health status to economic productivity. Mason (1974:49) found statistical correlations that suggested, but did not demonstrate, the influence of physical disability in the gradual shift from subsistence to cash-oriented modes of livelihood. Other factors of modernization also contributed to this shift, including better educational opportunities, the availability of vocational training programs and welfare and unemployment funds, and an increase in available jobs (Mason 1974:50). These findings suggest in the acculturative context illness played a role in subsequent adaptation, however, it should be considered as only one, albeit novel, ecological pressure on the population (Fisher 1969:133).

The following chapter outlines the methodology employed in the research. In reconstructing the epidemiology of tuberculosis in the Saskatchewan Indians, the main methodological tools were borrowed from the science of epidemiology. The history of medical services to the Indians is drawn mainly from secondary published sources supplemented by archival materials. The data used to elicit the tuberculosis hospitalization experience for the individual are based on interviews.

4. METHODOLOGY

4.1 Introduction

The use of a broad ecological model allows for a diverse array of components and interactions to be probed. Within the ecological framework, this research examines the epidemiology and ecology of tuberculosis in the Saskatchewan Indians. Within the context of this particular population's disease-experience, this research examines the development of health services to the Indians, with reference to its influence on the health status of the Indians. The individual Indians' perspective on the hospitalization and tuberculosis experience, not traditionally a component of ecological studies, though allowed for in the model, is also probed.

A number of data sources and types of data were used to examine the various components and interactions in the study. These include epidemiological statistics, archival and published documents and annual reports, and interview and patient history data. The following chapter discusses the research methods used in the study and the limitations of the research methodology.

4.2 Data sources

Statistics

Several epidemiological concepts were utilized to examine tuberculosis among the Saskatchewan Indians. Epidemiology, "the study of the distribution of a disease in human populations and of the factors that influence this distribution" (Lilienfeld and Lilienfeld 1980:4), by definition, utilizes an ecological frame of reference. In this study, the epidemiologic data is used to illustrate the course of the tuberculosis among the Indians of Saskatchewan, to demonstrate the extent to which tuberculosis continued to be a problem throughout the period of study, and to examine the ecology of tuberculosis

in this population.

The science of epidemiology has developed several concepts of disease and a methodology which are useful to medical anthropology. Unlike the geneticist who concentrates on genetic factors, or the medical clinician who examines the individual case, the epidemiologist integrates data from a diverse array of sources in an overall examination of disease patterns in human groups (Lilienfeld and Lilienfeld 1980:48).

Two triads demonstrate the epidemiological methodological framework. The first, composed of *agent, host and environmental* factors, is used to assess the occurrence of disease in human populations. In order for an individual or population to get a disease, the agent must be present, the host must be susceptible, and the environment must be suitable. If the host is not susceptible, the agent, although present in the environment, will not cause disease in the individual. Host factors are intrinsic factors such as genetics, age, sex, ethnic background, physiologic state, prior immunologic experience, intercurrent illness, and human behavioural factors such as diet and hygiene; the individual factors as outlined in the ecological model presented in the theoretical orientation. Environmental (extrinsic) factors are as important to disease acquisition, because the environment influences the existence of the agent, the amount of exposure to the agent, and the host's susceptibility to the agent. The environmental factors which are examined in studying the occurrence of disease in epidemiology include the elements in ecological models; the physical (inorganic), biological (organic) and social environments (Lilienfeld and Lilienfeld 1980:47).

The second triad used in the epidemiological research methodology is the *person, time, place* triad. These are the factors which influence disease distribution. The interrelationships of these components are used to investigate the distribution of disease, or a specific disease in a human population. In the present epidemiological study of tuberculosis, the Indians are the specific persons examined; the time period encompasses

the period from 1926 to 1965; and the place of the study is Saskatchewan, and selected Indian agencies within the province.

To establish the time trend of tuberculosis among the Saskatchewan Indians, historical and archival data from the work on Indian tuberculosis conducted by Dr. R.G. Ferguson (1928), and statistical data were used. Statistics included mortality and morbidity data from Anti-Tuberculosis League documents, and mortality data derived from the League's case-registry. Census data to obtain mortality rates were taken from Department of Indian Affairs Annual Reports.

This study utilizes Department of Indian Affairs population data for several reasons. They were available for all of the years involved in the study, at five year intervals. In comparison, Statistics Canada census figures were available at only ten year intervals. Saskatchewan Hospital Services population data, possibly the most accurate population figures, were available only for the latter part of the study period, beginning in 1958. For consistency, the Department of Indian Affairs population data were used for the entire study period.

To determine the geographical distribution of tuberculosis among different Indian populations within the province of Saskatchewan, through the time period of the study, mortality statistics were compiled by the researcher. To demonstrate the distribution of the illness by persons, comparative tuberculosis data (standardized mortality and morbidity rates) for the non-Indian population in Saskatchewan, were obtained from the Anti-tuberculosis League reports and files.

Mortality and morbidity data were the two measures used in the study to assess the frequency of tuberculosis in the Indian population. (The methodology for the calculation of these measures is presented in Appendix B and the methodology for standardizing these rates is in Appendix C).

Mortality measures the amount of death in a population. In this study data were obtained from patient cards on each of the Indian tuberculosis deaths reported in Saskatchewan from 1920-1984. This information was used to calculate mortality rates for the province, and for selected agencies within the province. The cards provided information including the individuals name, gender, age at death, residence, type of tuberculosis diagnosed, and place of death. In calculating the death rates for individual Indian agencies, the main difficulty encountered was the shifting boundaries of the various Indian agencies in Saskatchewan through the decades. For this reason, individual Indian agency mortality rates which are presented are based on information from those reserves which remained in the same agency throughout the entire time period of the study.

Morbidity measure the amount of illness in a population. The most common sources of morbidity statistics are data from communicable disease reporting, case-finding programs, morbidity surveys, and hospital admissions data (Lilienfeld and Lilienfeld 1980:133-134). The morbidity statistics used in the present study are based on case-finding programs, morbidity surveys and hospital admissions data. Beginning in the early 1930s, the Saskatchewan Anti-Tuberculosis League conducted case-finding surveys on several Indian reserves and in Indian residential schools in Saskatchewan. In 1965 when the Anti-Tuberculosis League took over responsibility for tuberculosis care delivery to the Saskatchewan Indian population, all Indian tuberculosis patients were transferred to League facilities morbidity data collected were based on sanatoria admissions.

Information from the reserve surveys conducted by the Saskatchewan Anti-Tuberculosis League gives some indication of the extent of illness in the particular areas surveyed. They were, however, for the most part isolated, one time surveys, and do not indicate the broader population's disease experience. As well, some uncertainty about the denominators used to calculate morbidity "rates" from these data suggest that the

information should not be used to make comparisons with rates reported elsewhere .¹

Several problems are inherent in using hospital admissions data. Not all cases receive hospital treatment, and the rates, therefore, do not accurately reflect illness among a population segment who do not receive this service. In the Indian population in Saskatchewan, until 1965, when case-finding programs among the Indian population reached as far north as Uranium City, hospital admissions may not have accurately reflected the amount of tuberculosis in the population. In the years following 1965, the hospitalization rates reflect a fairly accurate picture of tuberculosis.

For tuberculosis, calculation of the infectivity rate in a population was once a commonly used measuring tool. The amount of infectivity in a population, as determined by a positive reaction to tuberculin, was thought to reflect the potential amount of illness in that population. However, reaction to tuberculin does not necessarily indicate infection with the bacillus responsible for tuberculosis as a previous BCG vaccination will also produce a positive reaction. As well, sensitivity to tuberculin can be temporarily depressed by severe illness; viral infections; the use of cortico-steroids, and contraceptive pills (Grzybowski 1983:63). For these reasons, this particular analysis of tuberculosis among the Indians of Saskatchewan does not include a discussion of the "infectivity" of the population.

Archival Data Sources

Federal Government archival documents were examined to discover any information bearing on the goals of the research. Information was sought that made reference to the tuberculosis epidemic in Saskatchewan Indian Agencies; to the administration of health services in Saskatchewan; to the Indians' tuberculosis

¹ There is some confusion in the data on reserve survey if the population figures presented represent the surveyed population or the total reserve population.

experiences; and to the impact of tuberculosis on this population. Within the course of a week spent in the Public Archives of Canada (PAC) in Ottawa, I examined documents from: The Department of Indian Affairs general reports, health reports and letters dealing with Indian tuberculosis, correspondence of policy decision documents, agency log books and agents reports and diaries for Saskatchewan. In addition, the diaries, day books, reports and letters of health personnel including matrons and physicians were examined. The documents surveyed dated from the early 1910s through the 1950s.

Information on the administration of health services, and policy dealing with Indian tuberculosis was attained through these archival sources, as was general health status information, and data on tuberculosis mortality, morbidity, and hospital admissions. This gave one perspective on the administration of Indian health services. Some information on the Indians' responses to tuberculosis was also obtained.

Selected documents in the Saskatchewan Archives at the University of Saskatchewan, in Saskatoon were consulted, most notably the papers of Dr. P.E. Lavoie, the physician at the hospital at Ile a la Crosse from 1936-1953.

The most important source, however, was the files of The Saskatchewan Anti-Tuberculosis League. These files were obtained from the Anti-Tuberculosis League at their offices at Fort San. The office has since relocated and the files have been transferred to the Saskatchewan Archives Board. The files contained a wealth of statistical information; raw data from numerous reserve surveys, conducted mainly between 1943 and 1947, and tuberculin survey conducted in northern Saskatchewan in the 1950s; as well as correspondence on matters pertaining to Indian tuberculosis; and data from, and rough drafts of, many of the papers that Dr. Ferguson wrote pertaining

to Indian tuberculosis.

Annual reports of the various department responsible for Indian affairs and Indian health services through the time period of the study were utilized primarily in reconstructing the health services to the Indians throughout the relevant time period. The archival material was used to supplement this discussion of the tuberculosis services that the Indians of Saskatchewan received, and to corroborate information attained through published sources and interviews. With regard to this material it should be pointed out the I did not enter into a complete critical and historiographical analysis of this data source; I extracted information that was of a broad factual or chronological nature.

Interview Data

To discover the perspective of the hospitalized Indian patient fourteen interviews were conducted. The focus of the interviews was the individual patient's perception of tuberculosis and his/her sanatorium or Indian hospital experiences. Additional questions addressed the effects that these experiences may have had on their lives since the time of their illness.

Interviews were conducted in the winter of 1987-1988 and the spring of 1988. All of the individuals interviewed were hospitalized for tuberculosis treatment in the late 1940s through the 1960s. All, with the exception of three, were from reserves from the southern part of Saskatchewan.

The patient interviews were set up through initial correspondence by mail with the Chiefs of all of the Indian bands in Saskatchewan, explaining the research goals and

asking for their assistance in locating former tuberculosis patients to interview. Nine of the bands (25%) that were approached responded either by telephone or through the mail. Several individuals recommended further contact with their Community Health Representatives, while others provided a list of people whom they had approached regarding an interview. On one reserve, a woman who worked in the Band office, contacted the researcher and we spent three days travelling throughout much of the Qu'Appelle Valley, interviewing the people that she had contacted. The interview schedule is provided in Appendix D.

Additional information was also obtained from several informants, outside of the formal interview situation, and several current, and recently retired League personnel were also consulted. These included Dr. G.D. Barnett, the last General Medical Superintendent of the Saskatchewan Anti-Tuberculosis League; Dr. Ed Ring, a long time league employee; Jean Graham, who was the nurse coordinator for anti-tuberculosis activities in Saskatchewan until her retirement in 1988; Dr. V. Hoepfner, the current "Dr. George Ferguson Professor" at the College of Medicine, University of Saskatchewan; Brian Graham, the Executive Director of the Saskatchewan Lung Association; and Dr. G. Horsman, the current Director of Tuberculosis Control for the Province of Saskatchewan. Olga Buhler, an employee of the League at the Prince Albert sanatorium in the early 1950s, was consulted regarding the day-to-day operations of the hospital.

In addition to formal and informal interviews, the researcher spent a considerable amount of time with one particular informant, who although she had not had tuberculosis herself, had lived surrounded by tuberculosis in her family and her community. She had a wealth of knowledge, from both an emic (insider) and an etic (outsider) perspective.

Her involvement in the tuberculosis scene provided many useful insights and presented a unique perspective on the tuberculosis hospitalization experience.

In each of the interviews, the interview schedule as it is presented was not strictly followed. However, in summing up the discussions, the main topical areas in the schedule were reviewed, to ensure that none had been omitted. Direct questioning was generally avoided. If, however, it was perceived that the interviewee would respond favourably to being questioned directly, or if the discussion lagged and questions had to be interjected, the questions outlined on the interview schedule were then asked. In most cases however, the interviews went well because the formal "interviewer" role was avoided. Because the interviews were open-ended, they included discussion of a myriad of topics other than tuberculosis experiences. Most people were very open, talked quite freely, and were not uncomfortable in giving general life-history information in addition to the major emphasis on their tuberculosis experience.

Once the interview data were collected, analysis indicated that information was presented dealing with (1) the individual patient's perception of tuberculosis; (2) their sanatorium or Indian hospital experiences; and (3) some, although limited, data on the effects that these experiences have had on the individual's lives since the time of their hospitalization. Some common themes, or experiences emerged, however, the "effect" of the experience on the ex-patient's lives appears in most cases to have been minimized, likely due to the passage of time; at least 30-40 years had passed between the event and the interview. Because the sampling of patient perspectives presented in the interviews is not "representative" of the Indian population of Saskatchewan, generalizations about a cumulative Indian tuberculosis experience were not made in the analysis of data.

4.3 Methodological limitations

The major limitation to the statistical analysis of tuberculosis was the problem encountered in obtaining accurate census information for the Indians of Saskatchewan. The present study utilized Department of Indian Affairs population data, as these were available for all of the years involved in the study, at five year intervals. These population data, however, were not suitable for analyzing the age distribution of tuberculosis in the population. The age groupings in the various census years changed from census to census, and in most years, all individuals aged 25-64 were grouped together into one age category.

Archival examination of Government documents may have produced different results if more time could have been spent perusing the documents. Certainly a degree of researcher bias influenced the results. In specifically looking for information relating to the "effects" of tuberculosis on the population, the examination may have overlooked other material related to the epidemic which was equally as important. In addition, by utilizing government reports and documents, and published documents based on these sources, the reconstruction of the history of tuberculosis services is also biased toward the government point of view. However, the material that was obtained contributed an essential "human" dimension to all the statistics analyzed on tuberculosis in this population. For example, diaries of agents and matrons, added names to the numbers. No longer did the premises of the study rest on a box full of raw data on deaths. The statistics became real people who laughed, loved, and cried. They became real families who wrote to the government pleading to have their sick children sent to a sanatorium for treatment. The examination of archival documents demonstrated that although the

federal Indian Department was constantly plagued by budgetary limitations, and influenced by the belief that Indians would not benefit from and would not accept sanatorium treatment, many Saskatchewan Indians did take an active role in pursuing medical attention, and several also received sanatorium treatment before it became the standard treatment in the late 1940s.

In addition to several of the historical archival documents, the intent of the interviews contributed an essential "human" dimension to the study. The methodology of interviewing randomly sampled individuals so that statistically significant correlations could be obtained may have been a viable option for the interview methodology because so many Indians had tuberculosis and were treated in the 1950s and 1960s. However, the intent of the interviews in probing for a human dimension and individual perspective on tuberculosis indicated that such a quantitative analysis was not the appropriate methodology for the present study. In addition, the open ended nature of the questions precluded the use of a standardized questionnaire. Based on some of the results of the interviews, design of a quantitative survey tool may be possible.

Since individuals who were interviewed were not randomly selected, but were self-selected, they represent an interesting and likely biased sample. Most of them were in the sanatorium or Indian Hospital in the 1950s (late 1940s, in two cases). While in the sanatoria they were also all children, or young teenagers, and they received chemotherapy treatment. Several of those who responded to my letter personally are well educated individuals who today are successful professionals.

A geographical bias also influences the interview data. Except for three interviews, the remainder of the ex-patients interviewed lived within 150 kilometres of the

nearest sanatorium or Indian hospital. Many of them had friends in the sanatoria, and most had many visitors. Certainly the sanatorium experience would have been different for those who were evacuated from isolated communities in northern Saskatchewan. Because of the low response rate, and the geographical bias of those interviewed, the interviews do not represent a random sample of the Saskatchewan Indian population. As a result, the case studies are not necessarily "representative" of the Indian population, and analysis did not attempt to elicit a cumulative perspective.

4.4 Conclusion

Because of the diversity of components and interactions examined in this study, within the framework of an ecological model, this research utilized many types of data. These included epidemiological statistics, archival documents, published documents and annual reports, and interview and patient history data. Statistical analysis preceded the archival and interview segments of the research.

The major methodological limitations of the study involved the constraints placed on statistical analysis by the census data available; the time limitation in collecting archival data; and biases in the selection of people to interview. Because the ecological model allowed examination of a broad array of interactions, the research was only able to "probe" the Indian perspective through interview data. Further research of this perspective, perhaps using an ethnomedical frame of reference, is recommended.

The following chapter discusses the epidemiology of tuberculosis among the Indians of Saskatchewan and discussed the ecology of tuberculosis in this population.

5. TUBERCULOSIS AMONG THE INDIANS OF SASKATCHEWAN

5.1 Introduction

The first objective of this research was to examine the epidemiology and the ecology of tuberculosis among the Indians of Saskatchewan. The literature reviewed indicated that reconstructing the epidemiology and eliciting the ecology of diseases in anthropological populations is an important first task for medical anthropology (Campbell 1989). This has not been done for tuberculosis in North American Native groups, nor for Saskatchewan Indians since Ferguson's work in 1928.

5.2 Tuberculosis among the Indians of Saskatchewan

Dr. R. G. Ferguson, the first Medical Director of the Fort Qu'Appelle sanatorium when it opened in 1917 (Wherrett 1977:186) was the definitive expert on tuberculosis among the Indians of Saskatchewan for the first half of this century. Dr. Ferguson's interest in Indian tuberculosis may have begun as early as 1921¹ when a Royal Commission inquiry into tuberculosis in Saskatchewan indicated an extremely high rate of infection among the Indian children in the province:

It was found from the incidence by nationality that the Indian children showed a very high percentage of infection - 93.1%, compared with the average for other racial origins - 54%. The relation between incidence of infection and place of birth throws some light on the tuberculization of the Saskatchewan-born as compared with those born in other provinces of Canada as well as with British born (Ferguson 1922:2).

¹ Alternatively, Dr. Ferguson's interest may have come from his training in Manitoba under Dr. D.A. Stewart.

In 1926 Dr. Ferguson was awarded a grant from the National Research Council to study the Indians of the Prairies to determine what changes have taken place in the their manner of living and their past experience with regard to tuberculosis (CTAB, 1928; 6(3):4). Ferguson's research objectives included: determining the general death rate and tuberculosis mortality rate through the course of the epidemic (to 1926); obtaining information about the "progress and process" of acquiring resistance to tuberculosis; assessing the extent of tuberculosis morbidity among the Indians; determining the rate of active tuberculosis cases who recover given present living conditions on reserves and in Indian residential schools; evaluating the predisposing causes of the epidemic; differentiating the type of bacillus causing illness among the Indians (human or bovine tuberculosis); and, assessing the necessity for a preventive vaccine (Ferguson 1928:9).

A preliminary report of Ferguson's study, Tuberculosis Among the Indians of the Great Canadian Plains (1928), outlined the course of the epidemic among the Indian population, and evaluated several predisposing causes of tuberculosis by examining the causes of the rapid increase observed in the tuberculosis incidence in this particular population.

With a sample population from eight southern Saskatchewan Indian reserves (Ferguson 1928:9), Dr. Ferguson compiled statistics on Indian tuberculosis for the period beginning in 1880, when the Saskatchewan Indians were first settling on reserves. Dr. Ferguson chose to study this particular population for several reasons. Historical records were available extending as far back as 1738 attesting to the physical status of the Indians and indicating that tuberculosis was uncommon before the reserve period. Other studies had indicated that the Indians of the Plains were the last large group of Indians to be tubercularized (Ferguson 1928:1). Precipitated by their move to reserves and the extermination of the buffalo, the population had recently gone through a major and rapid

lifestyle transformation involving a complete change in occupation, food, dwelling and sanitary conditions. In addition, in 1884 boarding schools for Indian children were established and a large number of children were concentrated in one school. As well, fairly complete statistical information was available on the epidemic and information was also available on the Indians dietary, sanitary, lifestyle and economic habits (Ferguson 1928:1-6).

The antiquity of tuberculosis in the Saskatchewan Indian population comprised a major portion of Ferguson's report. Sporadic cases of tuberculosis among the Plains Indians had been observed after 1858, but they were rare occurrences until at least the early 1870s (Ferguson 1928:42; CTAB, 1928; 7(2):4). "Alexander Henry records tuberculosis as being present on the Red River in 1800 and odd cases on the Saskatchewan were noted by Hudson Bay Company employees as early as 1797. These writers, however, make no mention of seeing it among the Western Plains Indians until about 1860" (Ferguson 1928:7). The doctor who accompanied the Franklin expedition, while wintering on the Saskatchewan in 1820, examined several Indians at Fort Edmonton, yet made no mention of tuberculosis. Dr. Hector, with the Palliser expedition, between 1858 and 1860, wrote in his journal about giving medical services to the Indians, yet he too makes no mention of tuberculosis. "Sir William Francis Butler, who investigated the extent of and destitution wrought by the smallpox epidemic on the Saskatchewan in 1870, makes no observations regarding tuberculosis" (Ferguson 1928:7). In 1881, Father Scollen, a missionary, related to Mr. McEntyre of Fort Qu'Appelle an account of the recent appearance of tuberculosis among the Blackfoot. Only five years earlier, Father Scollen, in a memorandum to the Governor of the North West Territories, made mention of smallpox among the Blackfoot but no mention of tuberculosis (Ferguson 1928:7-8). Ferguson also cites the testimony of living members of the Royal North-West Mounted Police, early settlers and traders. Several prominent

Indians who Ferguson interviewed "maintain that coughing sickness-as they called it-was not noticeable before the disappearance of the buffalo" (Ferguson 1928:8).

Ferguson (1928) concluded that prior to the reserve period tuberculosis was rare in this population. An acute epidemic of tuberculosis began in the early 1880s, suggesting a relationship between the move to the reserves and the rapid increase in the number of tuberculosis cases. Once he established that tuberculosis in this population was rare prior to 1880, Dr. Ferguson examined the health status of the Indians. He discovered "a tremendously high death rate among the Plains Indians" (Ferguson 1928:9), and based on a sample from two reserves, "more than two-thirds of the deaths during the period of the high death rate were due to tuberculosis" (Ferguson 1928:12).

The number of tuberculosis deaths in the Indian population increased dramatically after 1882; it was so common by 1884 among the Indians that it assumed epidemic proportions. The epidemic appeared to have reached its height, among the Qu'Appelle Indians in 1886 with a death rate of 90 per 1,000. ²

After 1890 the epidemic in the Qu'Appelle Indians began to subside. In 1901 the death rate declined to 2000 per 100,000, and to 1,000 per 100,000 by 1907, "with little change in living or sanitary conditions" (Ferguson 1934:7). Between 1907 and 1926, with gradually improving living conditions and acquisition of resistance in the population, without application of any specific anti-tuberculosis measures, the death rate among the Qu'Appelle Indians slowly fell to 800 per 100,000 (Ferguson 1928:10,12; Ferguson 1934:7).

² In the Blackfoot the tuberculosis mortality rate peaked in 1902 (Ferguson 1928:42; CTAB 1928 7(2):4).

With this incredibly high rate of death, how could the Indian population have survived? From what little data are available, it appears that the rate of birth among the Plains Indians offset the high death rates. Although the death rate from tuberculosis was high in Ferguson's study, his graph of the tuberculosis epidemic (Ferguson 1928:11) shows that the birth rate, remained very close to the general death rate, throughout most of the epidemic period with the exception of 1886 to 1894, when the tuberculosis death rate peaked.³ Other studies also attest to an extremely high birth rate in the Indian population of the Plains during this time period. In a survey conducted in 1907, Peter Bryce, Chief Medical Officer in the Indian Department, found that in Saskatchewan, births exceeded deaths from all causes for most bands.

Table 5.1 shows that births exceeded deaths for most of the Saskatchewan agencies surveyed. A comparable birth rate of 42 per 1000 was also reported by Wissler (1936a:6) for the period 1884-1934. In a study of the Plains Indians, including Indians in Saskatchewan, Alberta and Montana, Wissler found that the population nadir was reached in 1904 in these Plains groups, much earlier than that recorded for all Canadian Indians. Investigating what contributed to the increasing population after 1904, Wissler hypothesized that either the birth rate was increasing, the death rate was decreasing or both were occurring. He found a fairly steady birth rate, and a declining death rate. Wissler also notes that 42 per 1000 is an extremely high rate of birth, "perhaps near the physiological maximum" (Wissler 1936a:6). These data indicate that the population of Plains Indians was not decreasing after 1904, however, this varied with different bands,⁴ and across Canada.

³ It is difficult to estimate the birth rate from Ferguson's graphical representation of the trend (tabular data were not made available). However it appears to fluctuate around 30-50 per 1000 for the entire study period. Interestingly, in the period 1886-1894 when tuberculosis deaths increased, the birth rate also increased substantially.

⁴ For example, Wissler (1936b:227) found that among the Blackfoot of Alberta the population decline continued steadily from 1890 to 1929.

Table 5.1 Table of Saskatchewan births and deaths, 1907

Agencies and Bands	Pop.	Births	Deaths	Birth Rate per 1000	Death Rate per 1000
Battleford 10 Bands	886	09	03	10.16	3.39
Onion Lake 7 Bands	957	67	45	70.01	47.02
Duck Lake 7 Bands	944	28	21	29.66	22.25
Touchwood 5 Bands	621	24	17	38.65	27.38
Crooked Lake 4 Bands	547	24	21	43.88	38.39
Qu'Appelle 8 Bands	867	24	18	27.68	20.76
Moose Mountain 1 Band	187	05	06	26.74	32.09
Assiniboine 2 Bands	318	06	03	18.87	9.43
Pelly 4 Bands	528	21	33	39.77	62.50
Carlton 9 Bands	1605	39	44	24.30	27.41
<hr/>					
Total Sask. Agencies	7470	247	211	33.07	28.25

From the Report of P.H. Bryce, Chief Medical Officer, Department of Indian Affairs, Ottawa July 5, 1907

For the Canadian Indian population as a whole, Stone estimated that the population should have increased by 20,000 from 1904 to 1917. Instead it showed a decline of 1,639 persons (National Indian Brotherhood 1979:13).

Based on his observation of tuberculosis in the Indian population, Ferguson concluded that it was the introduction of a new infectious disease in its "epidemic" phase that he was witnessing. When a new infection is introduced into a susceptible population, mortality and morbidity rates take the predictable form of an epidemic wave. In many illnesses, this wave is measured in terms of a few weeks or months, but in tuberculosis it is measured in decades and centuries (Stead and Dutt 1987:2).

Following the course of this epidemic until it became endemic in the population, as it was in the surrounding non-Indian population at this time, Ferguson (1928;1933)

was able to delineate the characteristics of tuberculosis as it is experienced by a 'virgin population' (Wissler 1936b:229). These characteristics of the wave of infection included an initial sharp increase in the number of deaths followed by a gradual descent (Stead and Dutt 1987:1); a change in the clinical course of the disease from acute to chronic; a change in the type of tuberculous lesion from generalized to localized; and a shift in the age-incidence of mortality to mimic the age-incidence of mortality in the surrounding non-Indian population (Ferguson 1933:4).

In terms of the clinical course of tuberculosis, the acute phase of the epidemic lasted about two decades, at which time the number of deaths began to slowly decrease (Ferguson 1928:42). During the acute phase the majority of cases terminated in several months. By 1931, however, the dominant type of tuberculous disease was chronic, with approximately 16% of cases being acute, terminating within one year of onset (Ferguson 1933:4).

Two physicians who attended the Qu'Appelle Indians indicated that all forms of the disease existed during the initial epidemic phase - pulmonary, osseous, glandular, and meningeal. The most common fatal form of tuberculosis among Indian infants was generalized tuberculosis, while among young and older adults it was pulmonary tuberculosis (Ferguson 1928:15,43). The frequency of glandular tuberculosis in all ages during this acute phase of the epidemic was tremendous, affecting one third of the population. In 1906, at the Qu'Appelle school, 40 children out of 205 or 20% had their glands operated on (Ferguson 1928:15; CTAB, 1928; 7(2):4). Surveys of school children in the Qu'Appelle and File Hills schools indicate that in 1921 7.4% of the children were affected. By 1927 only 2.8% were affected, and by 1931 less than 1% of the children required treatment for enlarged tuberculous glands (Ferguson 1933:4).

Regarding the shifting age-incidence of tuberculosis mortality, Ferguson found that the age group in which the maximum deaths occurred gradually shifted through the

course of the epidemic. During the initial acute phase of the epidemic all age groups were affected, however, the highest mortality was among children. The age of maximum susceptibility between 1886 and 1906 was under 5 years. During the next 20 years, from 1907 - 1926, in which Ferguson termed "the period of subsidence", the age of maximum fatal susceptibility had shifted to late childhood from the ages of 10 to 14 (CTAB, 1928; 7(2):4). From 1927-1933 the age of maximum fatality was 15-19 years (Wissler 1936b:229), and by 1933 the age of maximum mortality approached the 25-29 year age group, the age of maximum mortality in the general Saskatchewan population at the time (Ferguson 1933:5). The decline in the death rate among the middle-aged and aged also indicated "a tendency to approximate the age-incidence of tuberculosis among the whites in the surrounding district" (Ferguson 1928:13).

During the epidemic phase, the proportion of tuberculous Indians who were infective, also appeared to be higher than average. In the Battleford Agency, the local doctor, Dr. Millar noted in 1918: "From my observations since I began looking after the Indians....50% of those I have treated are tubercular and capable of infecting others" (PAC RG10, Vol.1015 p.193). When Dr. Ferguson tested 374 Indian school children he found that on admission to school at an average age of 7.6 years 60% of the children were sensitive to tuberculin and at 11 years of age over 96% tested positive (Ferguson 1928:26; CTAB, 1928; 7(2):5).

Following the progress of the epidemic it became apparent to Dr. Ferguson that successive generations (20 year cohorts) of Indians were affected by the epidemic differently, as the Indian population acquired resistance to tuberculosis, and as living conditions gradually improved. In a study of 1,874 individuals, representing the first three generations of the epidemic, Ferguson found that among the first generation, the generation of adult infection, 27% fell victims to the disease. The second generation, or the generation of childhood infection, suffered even greater loss; 33% having died from

tuberculosis. Among the third generation, whose parents were tubercularized before fecundity, 20% had died from tuberculosis (Ferguson 1928:17; CTAB, 1928; 7(2):4).

A study of 171 families on the Qu'Appelle and File Hills reserves was undertaken as part of the research (Ferguson 1928) to gain some insight into this process of attainment of resistance. 171 families participated in the study initially, however, 24 were lost to follow-up through migration. The study focused on the remaining 147 families. Of these 147 families, only 60 have survived three generations (41%). Of the 87 family trees that died out "in the process of civilization", twelve families were eliminated due to non-tuberculous causes; one entire family succumbed to tuberculosis; five families, with the exception of their aged grandparents, succumbed to tuberculosis; and of the remaining 69 families that died out, tuberculosis was responsible for one of every three deaths.⁵ Among the 60 families surviving to 1926, 21% of the family members had succumbed to tuberculosis (Ferguson 1928:16).

This indicates that those family trees which died out were non-resistant to disease in general rather than lacking resistance specifically to tuberculosis (Ferguson 1928:44; CTAB, 1928; 7(2):4). Since only one family succumbed to tuberculosis alone, Ferguson concluded that "specific susceptibility to tuberculosis, even among primitive people, appears to be rather rare" (Ferguson 1928:16).

Ferguson (1928) also examined the effect on tuberculosis rates of the infusion of non-Indian blood into the Indian population. This study involved 392 boarding school children, 210 being full-blood, and 182 known to have, or by appearance seeming to have, some mixed blood. Morbidity from tuberculosis was the same in both groups, however, "the mortality is considerably higher among the full bloods" (Ferguson 1928:24). This suggests that infusion of non-Indian blood confers increasing resistance leading to decreased rates of tuberculosis mortality. However, tuberculosis morbidity remained a

⁵ The tuberculosis death rate averaged 31.37% in this group (Ferguson 1928:16).

serious problem in families with mixed blood (Ferguson 1928:24; CTAB, 1928; 7(2)5).

Another facet of the project involved a study of types of tuberculous disease found in school children of the third generation of the epidemic, the grand-children of those first exposed to epidemic tuberculosis in 1880s. Between 1926 and 1928, 392 children between the ages of five and 18 were examined. Ferguson found 38 tuberculosis cases, and in the follow up for the next two years, 15 more children who developed tuberculosis. Two groups of children were differentiated: the non-resistant who die within a few months, without any unusual predisposing cause; and the majority of children who were resistant, who develop lesions and tended to localize them, who did not differ in their reaction from that expected of non-Indian children in the same age group (Ferguson 1928:27-29).

In summary, Ferguson's study indicates that by 1884 tuberculosis had attained epidemic proportion among the Indians of Saskatchewan. The epidemic reached its height by 1890. The acute phase of the epidemic, characterized by disease terminating in a few months or even weeks, persisted for about 20 years. The epidemic then subsided. Throughout the period of subsidence, the death rate slowly declined. However, in 1926 it continued to be 20 times higher than the rate in the surrounding population.

By the early 1930s, tuberculosis was endemic in this population: the Indians of Saskatchewan had acquired some resistance to tuberculosis; the age-incidence of maximum mortality was nearing that of the surrounding population; and the most common type of lesion was the chronic pulmonary type in which the disease is localized in the lung.

Dr. Ferguson's research on tuberculosis among the Indians continued after the epidemic in the Qu'Appelle Indians subsided. He continued to collect data on Indian tuberculosis, and he carried out studies of tuberculosis infectivity, and the effect of BCG

on tuberculosis until the time of his retirement in 1948.

The collection of statistics on Indians tuberculosis infectivity, morbidity, and mortality did not end with Dr. Ferguson's retirement either, but rather it was continued by Dr. G.D. Barnett, into the 1980s. These data, however, have never been analyzed. The rest of this chapter will attempt to illustrate the continuation of the tuberculosis experience for the Indians of Saskatchewan.

In 1926, the tuberculosis death rate, on the File Hills and Qu'Appelle Reserves fluctuated around eight to ten per thousand, or in terms more current in epidemiological studies, 800 - 1,000 per 100,000. The continuing decline of the death rate is presented in Table 5.2, and Figure 5.1 (Figures are in Appendix E).

Table 5.2 Saskatchewan Indian tuberculosis deaths per 100,000 population, 1929 - 1964

<i>Year</i>	<i>Deaths</i>	<i>Population</i>	<i>Rate Per 100,000</i>
1929	87	10,784*	806.75
1934	84	11,878	707.19
1939	82	13,020	629.80
1944	66	14,158	466.17
1949	68	16,308	416.97
1954	13	18,750	69.33
1959	9	23,280	38.66
1964	7	28,914	24.21

*Census Data - Department of Indian Affairs

Using arbitrary five year intervals, these data demonstrate the gradual decline of the tuberculosis death rate among the Indians of Saskatchewan from 1929 to 1964, confirming Ferguson's observations after the recession of the acute epidemic phase. Table 5.2 indicates that, in 1929, the tuberculosis death rate remained high at more than 800 per 100,000. Twenty years later, in 1949, this rate had declined by half, to 417 per 100,000. This waning of the epidemic received a boost in the early 1950s with the introduction of specific drug treatment for tuberculosis. The death rate dropped dramatically to 69.33 per 100,000 in 1954. The success of chemotherapy treatment is attested to by the continued decline to 1964 with a rate of 24 per 100,000.

Figure 5.2 shows the tuberculosis death rate among the Saskatchewan Indians for every year from 1929 to 1959, to illustrate the fluctuating mortality rates recorded annually. In several instances, the rates actually went up in succeeding years. For example, between 1935 and 1937 the death rate increased from 627 per 100,000 to 851 per 100,000. The 1937 rate exceeds the maximum rate throughout the previous decade.

The sudden and temporary increases in tuberculosis mortality occurring between 1936 and 1940 were precipitated by the general decline in economic conditions in Canada throughout the 1930s (Allan and Gordon 1989:65) and the occurrence of intercurrent epidemics of other infectious illnesses. Ferguson's earlier examination of the influence of intercurrent epidemics demonstrated the resultant rise in the tuberculosis death rate stimulated by the presence in the population of other epidemic diseases, reducing resistance in general. For example, in 1890, an epidemic of measles in the Indian population caused the tuberculosis death rate to double temporarily for a period of about 3 years, after which the rate was maintained at the pre-measles epidemic rate (Ferguson 1928:31). Throughout 1935-36 several epidemics plagued the Indian population including whooping cough which was very common, and measles less so (Dept. of Indian Affairs Annual Report, 1935-36). In the winter of 1937 influenza was

prevalent in all of the Indians of Canada (Dept. of Mines and Resources, Indian Affairs Branch Annual Report, 1936-37). Throughout 1936, and until April of 1937, the Agent at Onion Lake Agency reports spending most of his afternoons visiting sick Indians in the residential school and on reserves, and he reported a great deal of influenza (PAC RG10, Vol.9085 Book 36-37).

Figures 5.1 and 5.2 were based on patient data, collected by Drs. Ferguson and Barnett, and more recently acquired by the author. Figure 5.3, is taken from a table prepared by Dr. Ferguson found in Anti-tuberculosis League files. These data for the period 1940-1963 show the same trend, and is included in this analysis to support the reliability of the data source used in the study.

Table 5.3 presents Saskatchewan tuberculosis death rates among the non-Indian population, the Indian population and the total provincial population.

Table 5.3 Saskatchewan crude tuberculosis mortality rates 1940 to 1963

Year	Non-Indian	Indian	Total
1940	17.55	637.76	25.91
1941	20.27	821.40	31.70
1942	16.80	775.61	27.70
1943	20.39	610.81	29.69
1944	17.27	496.30	24.90
1945	17.44	596.84	26.86
1946	18.32	515.10	26.66
1947	18.00	569.13	27.43
1948	18.23	491.98	26.46
1949	13.12	484.67	21.49
1950	10.49	401.33	17.51
1951	10.17	452.38	18.75
1952	6.54	299.33	12.34
1953	5.57	231.60	10.10
1954	3.51	67.27	4.81
1955	4.54	86.93	6.26
1956	4.06	57.98	5.23
1957	3.03	25.13	3.53
1958	1.73	38.43	2.59
1959	2.16	40.86	3.10
1960	2.93	34.53	3.74
1961	2.43	12.42	2.69
1962	2.65	23.94	3.23
1963	1.77	11.16	2.04

Source: Fort San File "Statistics tb deaths - 1930 age and sex" (Available from the Researcher or the Saskatchewan Archives)

Figure 5.4 illustrates the non-Indian and provincial mortality rates. These data are not directly comparable with the Indian rates because they are "Crude" in that they have not been standardized for age and sex difference in the two populations. Mortality rates are not comparable between populations unless they have been 'standardized' for age and sex differences in the two populations. The only year for which standardized mortality rates are available for the Saskatchewan Indian population is 1931. Table 5.4 shows the standardized mortality rates for the Indian and the non-Indian populations in Saskatchewan for 1931.

Table 5.4 Standardized tuberculosis death rates, Saskatchewan, 1931

<i>Age Group</i>	<i>Indian</i>		<i>non-Indian</i>	
	<i>male</i>	<i>female</i>	<i>male</i>	<i>female</i>
0-4	499.15	525.70	98.74	9.07
5-9	362.63	188.42	7.73	6.00
10-14	387.49	275.56	5.64	4.80
15-19	122.78	63.77	10.69	15.55
20-24	362.76	343.55	21.94	24.43
25-29	238.80	256.02	7.64	14.28
30-34	234.14	175.59	13.66	21.28
35-39	82.18	0.00	12.68	13.16
40-44	0.00	105.40	10.44	6.13
45-49	0.00	0.00	10.96	8.54
50-54	0.00	290.41	1.62	6.90
55-59	65.09	0.00	7.66	3.44
60-64	0.00	0.00	4.74	4.09
65-69	0.00	0.00	4.56	7.77
70-74	0.00	105.66	1.12	3.91
75-79	0.00	0.00	0.00	2.23
80-85	0.00	0.00	0.00	2.57
85+	0.00	0.00	0.00	0.00

Fort San File "folder not labelled" (Available from the Researcher or the Saskatchewan Archives, University of Saskatchewan)

When standardized for age and sex,⁶ the death rates are reduced in both populations, but as Figures 5.5 and 5.6 indicate, the immense difference in the Indian versus the non-Indian rates persists.

Figures 5.7-5.14 indicate differential effects of age and sex when the data have been standardized. For example, Indian males standardized rates show that over half (53.1%) of the tuberculosis deaths in the male Indian population occur in children under 14 years of age (Figure 5.8). In comparison, among the non-Indian males, this same category accounts for only 18% of the tuberculosis deaths (Figure 5.10). Among the Indian females, a similar picture emerges with 44% of the tuberculosis deaths being in children under age 14 (Figure 5.12). Among non-Indian females the age category to 14 years accounts for only 15% of the tuberculosis deaths (Figure 5.14). This difference in the age-incidence of tuberculosis is attributable demonstrates the different phases that the two populations were in terms of their experience with tuberculosis. In 1931, the age of maximum mortality for the Indian population was gradually approaching that of the total Saskatchewan population (Ferguson 1933:5).

As Ferguson found with his earlier data on the Indians, during the child bearing years, tuberculosis mortality differences between males and females are not significant (Figure 5.15), suggesting no association between childbearing and tuberculosis mortality.

Additional comparative data of tuberculosis mortality by racial origin are available for the years 1930-1932. These rates have not been standardized to my knowledge.

⁶ Dr. Ferguson began to standardize the rates and the researcher completed the task based on tables found in Fort San Archival files. The problem in not having standardized data available for analysis is not in determining the number of deaths by age and sex but involves getting population breakdowns for the Indians by "useful" age categories. The Department of Indian Affairs census data generally has only 5 age categories lumping into one group ages 21-65. They are also inconsistent between census years. For example in the 1924 census, categories are: Under 6, 6-15, 16-20, 21-65, and 65+. In the following three census years the categories change to: 0-6, 7-16, 17-21, 22-65, and 65+.

However, as demonstrated in the previous example, standardization does not visibly reduce the dramatic "difference" in tuberculosis mortality between populations. The pie-charts (Figure 5.17 and 5.18) were obtained from Anti-Tuberculosis League statistics which were calculated based on the 1931 Canada census, presumably by Dr. Ferguson. In 1931 the Indians of Saskatchewan comprised 2% of the population and accounted for one of every four tuberculosis deaths in the province (26% of the tuberculosis deaths).

In 1933, aware of the continuing high infectivity (69% on reserve by 9 years of age) from tuberculosis, the high tuberculosis mortality rate (575 per 100,000), and the low resistance to tuberculosis in this population, Dr. Ferguson undertook a major study of the efficacy of BCG vaccination as a preventive prophylaxis. In the 1930s BCG was not widely used in tuberculosis prevention, and Ferguson's aim was to indicate to the world its value, particularly in populations with little resistance to tuberculosis such as the Indians of Saskatchewan. The research extended over a period of 14 years. Indian babies born between 1933 and 1945 in the Fort Qu'Appelle Indian Health Unit were divided into two groups, with the "cases" receiving the vaccine (Ferguson and Simes 1949; Larmour 1987:39). Altogether, 609 Indian infants were involved in the study; 306 receiving the vaccine, and 303 controls not receiving the vaccine.

The result of the study (Table 5.5) indicate that BCG provides valuable protection against tuberculosis in this population. Of the 306 vaccinated infants there were six cases of tuberculosis and two tuberculosis deaths, a morbidity rate over the 14 years of 20 per 1,000, and a mortality rate was 6.5 per 1,000. In the control group of 303, there were 29 cases of tuberculosis (a morbidity rate of 95.7 per 1,000) and nine tuberculosis deaths (a mortality rate of 30 per 1,000). In addition, the type of disease found in the control group was of a more serious and generalized nature than among the vaccinated group.

Table 5.5 Results of a 14 year study of BCG among Indian infants

GROUP	NUMBER	DEATHS	RATE	CASES	RATE/1,000
Cases	306	2	6.5	6	20
Controls	303	9	95.7	9	30

Ferguson and Simes 1949, B.C.G. Vaccination of Indian Infants in Saskatchewan. Tubercle 30:5-11.

By 1944, the tuberculosis death rate among the Saskatchewan Indians had decreased to 466 per 100,000. Because medical services and surveillance to Northern Saskatchewan were still in the developmental stage, it is quite likely that this rate was actually much higher. In fact, problems of reporting of Indian tuberculosis occurred all over the province. Since the Indians received treatment in federal Indian hospitals, Provincial sanatoria, or received no treatment at all, statistics collected may represent only a portion of the true rate. Regardless, with the introduction of drugs to treat tuberculosis in the late 1940s and the increased availability of sanatoria beds for tuberculous Indians in the early 1950s, the death rate from tuberculosis among the Indians rapidly declined, to just over 69 per 100,000 in 1954 and 38 per 100,000 in 1959.

Within the province of Saskatchewan, the Indian tuberculosis death rate varied from band to band. In response to a circular sent to Indian agents on Saskatchewan reserves in 1909, Dr. P.H. Bryce compiled the statistics presented in Table 5.6. These data suggest that the epidemic in Saskatchewan reached different groups at different times and had a varying impact.

Table 5.6 Table of Tuberculosis in Bands, Saskatchewan 1909

<i>Bands</i>	<i>Surveyed Pop.</i>	<i>Cases</i>	<i>Rate per 1000</i>	<i>Rate per 100,000</i>
<i>The Pas</i>	419	13	31.03	3102.63
<i>Onion Lake M</i>	329	16	48.63	4863.22
<i>Onion Lake F</i>	421	28	66.51	6650.83
<i>Touchwood</i>	532	26	48.87	4887.22
<i>Duck Lake</i>	263	4	15.21	1520.91
<i>Daystar Reserve</i>	78	7	89.74	8974.36
<i>Muscowequan</i>	137	5	36.50	3649.64

From the Report of P.H. Bryce, Chief Medical Officer, Indian Affairs, June 30, 1909

To examine these observations further, the tuberculosis death rates for six different Indian agencies throughout Saskatchewan were compiled. These data indicate a variety of experiences for different Indian groups. Figures 5.18 through 5.23 show the tuberculosis death rate in selected agencies compared to the over all Indian tuberculosis death rate for the province from 1927-1957. These data suggest that although the death rate among the Qu'Appelle Indian in Dr. Ferguson's sample was 800 per 100,000 in 1928, this was not necessarily indicative of the situation for other Indian groups in the province. For example, in the more remote Pas/Carlton agencies, the tuberculosis death rate remained around 1500 per 100,000 into the early 1940s, as it did in Duck Lake agency. At the same time the death rate in those agencies accessible to the Fort Qu'Appelle Indian Health Unit and hospital, established in 1928, were far below the provincial average as early as 1930.

These varying death rates within the province indicate the later tubercularization of more northern and/or remote Indian groups, and their resultant lack of immunity; and the effectiveness of anti-tuberculosis preventive and treatment measures, once made

available in the southern agencies, in combatting tuberculosis mortality.

With the final decline of the tuberculosis death rate in the 1950s by the early 1960s, tuberculosis infectivity and mortality were no longer suitable indicators of the amount of tuberculosis in this population. Instead, the morbidity rate had to be observed to assess the extent of the continued problem.

Prior to the 1960s, the Saskatchewan Anti-Tuberculosis League did not maintain separate statistics on tuberculosis morbidity among the Saskatchewan Indians, as many Indians received treatment outside the Leagues mandate in the Indian hospitals at North Battleford and Fort Qu'Appelle. In 1965 when the League took over responsibility for treatment of tuberculous Indians, all Indian patients were admitted to League facilities, at which time the League began to maintain separate statistics for the provincial Indian population (Fort San File: "Tb Deaths 1901-1986").

Some indication of the extent of tuberculosis morbidity in this population, prior to 1963, can be discerned from data from various morbidity surveys carried out by the Saskatchewan Anti-tuberculosis League (mainly between 1943 and 1947) as well as from Public Archives of Canada sources. Seven reserve x-ray surveys carried out in 1944 record prevalence rates varying from 83 per 1000 among the Standing Buffalo Indians, to 135 per 1000 on Poorman reserve. Fishing Lake and Cote reserves also had prevalence rates in excess of 100 per 1,000 in 1944 (Fort San File "1934-47 Surveys").

In 1937 the James Smith reserve recorded a tuberculosis prevalence of 106.7 per 1000, while in a 1945 survey it continued to be as high as 108 per 1000 (Fort San Files, "Indian TBu Data 1937"; "1934-47 Surveys").

Figure 5.24 illustrates tuberculosis morbidity, the continued tuberculosis problem among the Saskatchewan Indians, and the persistent disparity between Indian and non-Indian rates from tuberculosis from 1963-1985. In 1964, when the mortality rate in the Indians population was just over 24 per 100,000, in the non-Indian population it was 1.64

per 100,000; 15 times higher among the Indians (Saskatchewan Anti-Tuberculosis League Annual Report, 1965). Morbidity rates in this same year were 199 per 100,000 for the Indians compared to 17 per 100,000; morbidity being 12 times higher among the Indians.

Over the following 20 year period, the incidence of tuberculosis in Saskatchewan declined. In 1984 the rate for the Indians was 100 per 100,000, and for the non-Indian population 4.6 per 100,000. To 1984 the Indians continued to have a morbidity rate 21 times higher than the non-Indian population.

The four pie-charts (Figures 5.25 - 5.28) illustrate the percent contribution to population and to tuberculosis for the Indian and non-Indian populations in Saskatchewan. In 1963 just under 3% of the Saskatchewan population was Indian, and they comprised over 39% of the tuberculosis. In 1985, the Indian population represented 5% of the total Saskatchewan population, and almost 54% of the provincial tuberculosis cases. Caution must be exercised, since these data actually reflect the decline in tuberculosis cases in the general Saskatchewan population rather than high rates among the Indians. However, while tuberculosis still contributed substantially to illness in the Indian population (See Figure 5.24) into the 1980s, they also began to succumb in growing numbers to the same illnesses that were now prominent in the general population including heart disease, cancer, diabetes and other new "diseases of civilization" (Brady, 1981).

5.3 The ecology of tuberculosis in the Indians of Saskatchewan

When groups such as the Indians of Saskatchewan came into extended contact with Western peoples not only were new organisms introduced which upset their ecological balance and caused disease but their diet and lifestyles often changed dramatically (Dubos 1968:71). Within the ecological systems model, in which components which are related to each other in such a way that a change in the state of

one produces a change in at least one other component, the impact of these changes are often reflected in the increased occurrence of disease. In Saskatchewan, in addition to the initial lack of population resistance to tuberculosis, several environmental changes and cultural factors contributed to extremely high infectivity rates, and may account for the varying experiences with regard to tuberculosis in different Indian populations within the province.

Among the Indians of Saskatchewan, the most important factor facilitating the epidemic and the spread of infection in the population was not the presence of the tuberculosis bacillus. Exposure to the bacillus is a necessary condition for contracting tuberculosis, but it is not sufficient for developing the disease (Dubos 1968:73). Concentration in fixed residences on reserves, and extended contact with the surrounding population were the two most important conditions that ensured the complete tubercularization of the Indians (Ferguson 1934:2; Stone, 1906). Wissler (1936a:7) suggests that placing the Indians on reserves was analogous to a system of concentration camps and it was well known that when people are thrown together in a new way, such as in military or prison camps, there is a rapid rise in disease. In addition to the concentration on reserves, Indian children were brought into close contact in large boarding schools, beginning in 1884, assuring the complete tubercularization of the second generation of Indians as well (Ferguson 1934:2).

Because it is rarely possible to account for the natural processes of disease in terms of simple and direct cause and effect relationships (Dubos 1968:76), the use of a broad ecological model allows for examination of several environmental components and their effect on population ecology. In addition to the concentration of the population on reserves and their contact with the surrounding population, other environmental and cultural factors also contributed to varying experiences with tuberculosis and modified the course of tuberculosis among the Saskatchewan Indians. These include the occurrence

of intercurrent epidemics in the population; changing dietary circumstances; changed living conditions including housing and sanitary practices; and anti-tuberculosis measures and intervention.

Intercurrent epidemics of acute illnesses, such as whooping cough, measles and influenza were coincident with a marked, temporary decreases in resistance to tuberculosis. Throughout the time span of Ferguson's study, epidemics of whooping cough (1887 and 1896), measles and influenza (1890), measles (1898 and 1910), influenza (1907 to 1909 and 1918-1919), and smallpox in 1914 swept through the plains (Ferguson 1928:31-32). In 1921 smallpox was reported on several reserves in the Meadow Lake Agency; at Joseph Bighead's, Island Lake, and Onion Lake reserves. The epidemic began in February of that year, and cases were reported as late as August, as far away as the Hay Lake reserve in Alberta (PAC RG10, Vol.9084 f.17) For the most part, these intercurrent epidemics influenced the general death rate, and the epidemics of 1890, 1898, and 1910 also disturbed the ebbing tuberculosis death rate (Ferguson 1928:32).

Although the Indians had adapted to a rationed diet by 1928, their sudden dietary change was an important predisposing factor in the acuteness of the initial phase of the tuberculosis epidemic among the Indians of Saskatchewan. Most populations are quite adaptable to a gradual change in diet, however, the diet change enforced on the Plains Indians with the extermination of the buffalo was sudden and complete. In addition to periods of scarcity for the first decade that Indians were confined to the reserves, their ration diet consisting of salt pork, white flour bannock and tea. It was deficient in calcium and iron, and low in alkaline salts and vitamins. As a result of these deficiencies, general resistance was lowered and the Indians were predisposed to infections of all types (Ferguson 1928:36).

In 1927-28 only 14% of the Indians lived on a sufficient diet of milk, butter, eggs, fresh and cured meat, green vegetables and a variety of fruits when available. Another 35% collected wild fruits in the summer and lived on a ration diet of 50 pounds of flour, two pounds of tea and three of rice a month, 30 pounds of bacon in the summer, and an equal amount of beef in the winter. The same proportion (35%) lived on a slightly better diet, adding to the above one of milk, eggs or fresh vegetables in the summer. The remainder of the population lived on an intermediate diet, a ration diet supplemented by two of milk, eggs or fresh vegetables (Graham-Cumming 1967:157-158; Ferguson 1928:35). Because the diet of the Indians on the Plains continued to be insufficient, several health conditions precipitated by a poor diet were observed. Enlarged tonsils and adenitis were found by Dr. Ferguson in the Fort Qu'Appelle Health Unit, as well as in a study in Manitoba where 24% of those surveyed had enlarged tonsils. Doctors monthly reports demonstrate many cases of constipation, deficiency diseases and carious teeth, further evidence of a poor diet (Graham-Cumming 1967:158).

Housing, sanitation and personal hygiene also contributed noticeably to the acuteness of the initial phase of the epidemic. Complete and abrupt change in housing conditions ensured the complete tubercularization of the Indian population. However, between 1886 and 1895 the tuberculosis death rate declined, "without any improvement in the factors controlling general health, such as food, housing and sanitation" (Ferguson 1928:40). This suggests that the decline was due to the nature of epidemics in general and "the physiological response of host rather than an improvement in living conditions" (Ferguson 1928:41).

Certain living conditions and practices which have been suggested influenced the course of tuberculosis for the Indians include: their misunderstanding of the need for personal cleanliness; their lack of knowledge regarding caring for the ill and concepts of contagion; and habits such as expectorating on floors (Graham-Cumming 1967:153).

In order to determine the influence of living conditions of tuberculosis mortality, Ferguson examined children raised on the File Hills Demonstration Colony comparing tuberculosis rates with children raised on the adjacent File Hills reserve. He found that projected tuberculosis mortality rates for children raised in the colony were 7% lower than rates among reserve children, concluding that improved living conditions, "plus a certain amount of selection based on fitness, resulted in a marked improvement in the tuberculosis death-rate" (Ferguson 1928:42).

In terms of the influence of medical intervention on tuberculosis mortality, Stead and Dutt (1987:3) suggest that the influence of the isolation of the tubercle bacillus, tuberculin testing, and BCG vaccination on the decline of tuberculosis has been exaggerated because the rate of decline was well established before the advent of any of these factors. Among the Indians of Saskatchewan, the tuberculosis mortality rate had been declining on its own for several decades prior to the application of any prevention or treatment measures.

A variety of environmental factors contributed to the tuberculosis experience among the Indians individual and family. The acquisition of resistance, however, was the clue to the survival of the population and the eventual recession of the epidemic (CTAB, 1928; 7(2):5). The process by which the resistance of the Plains Indians has increased involved weak and non-resistant individuals and families succumbing to the illness and not passing on their lack of genetic resistance to future generations; the infusion of more resistant blood into the population; and third generation sensitization, as opposed to the virgin soil population of the 1880s. After three generations of tubercularization the surviving Indians were biologically stronger. Improved living conditions in the broadest sense also contributed (Ferguson 1928:47). The living standard method of fighting tuberculosis did not prevent infection. It simply gave added protection to the more resistant members of the community, and prevented small infections from

developing into disease. It was little help to the non-resistant or those constantly exposed (Ferguson 1938:34).

5.4 Summary

The epidemic of tuberculosis among the Indians of Saskatchewan began in the early 1880s, peaked in 1886, and declined gradually after 1890; suggesting a link between the move to the reserves and the rapid increase in the number of tuberculosis cases. The decline of the epidemic was gradual with a rate of over 400 deaths per 100,000 population persisting to the end of the 1940s. The rate dropped dramatically to 69 per 100,000 by 1954 with the introduction of chemotherapy. In the 1960s morbidity became the standard indicator of the amount of tuberculosis in a population. In 1984 the incidence of tuberculosis (new reported cases) in the Indians remained 21 times greater than the corresponding rate in the non-Indian population in Saskatchewan.

Utilizing an ecological frame of reference, several factors which were involved in the Indian population's predisposition to tuberculosis infection and mortality were delineated. These include a lack of population immunity; concentration of the population on reserves; the occurrence of intercurrent epidemics; sudden and dramatic dietary change to a diet deficient in calcium, iron and essential vitamins; lifestyle changes such as housing, sanitation and personal hygiene; and most importantly the development of population resistance. "The above factors are interdependent and overlapping. In no case is the amount of improvement due entirely to one factor" (Ferguson 1928:47). It is interesting to note that, until 1928, the effect of medical intervention, was not an issue in influencing tuberculosis in the Indian population of Saskatchewan. As the following chapter will indicate, it was not considered because, in fact, there were no organized health services to these Indians for the first several decades of the epidemic.

6. THE DEVELOPMENT OF INDIAN HEALTH SERVICES

6.1 Introduction

The epidemic of tuberculosis among the Indians of Saskatchewan began in the early 1880s when they first began settling on reserves. The death rate from the epidemic reached its apex in the Qu'Appelle Indians in 1886, at 9000 per 100,000. After this time, with acquisition of population resistance and gradually improving living conditions, the rate declined. In 1926, the rate was still in excess of 800 per 100,000 (Ferguson 1934:7). No organized health services existed for the Indians throughout these first several decades of the tuberculosis epidemic. To put the statistical data presented in the previous chapter into a historical context, this background chapter reviews the development of health services to the Indians of Canada, and the development of tuberculosis services to the Indians of Saskatchewan. The impact of health services on Indian health is also discussed. It should be pointed out that this chapter is not a critical, substantive analysis of these services.

6.2 Health services of the Department of Indian Affairs

The 1867 British North America Act did not provide guidelines for the provision of health services to Indians (Young 1984:257). When the Department of Indian Affairs was established in 1880, no provision was made for medical care (Canada. Dept. of Indian Affairs Annual Report 1928/29:8; Graham-Cumming 1967:124) and only one of the Indian treaties contained specific provisions for health care. Treaty 6, signed with the Cree Indians of Alberta and Saskatchewan in 1876, stated that "A medicine chest shall be kept at the house of each Indian Agent for the use and benefit of the Indians at the direction of such agent" (Morris, 1880).

Although neither law nor treaty imposed obligation on the government to provide medical services for Indians, Parliament annually appropriated funds for the provision of these services (Stone 1935:82).

The exclusion of provisions for medical care in the BNA Act and the Indian Acts and Treaties was not "of deliberate design"; it reflected merely a lack of appreciation on both sides that there was any need for such a service (Graham-Cumming 1967:119). When the constitution was created and the Treaties signed, the Indians had their own medicine, that may have, at the time, been superior to western medicine. In addition, the political climate did not require that governments provide social or medical services as part of their mandate (Hodgson 1982:503): "At that time governments did little or nothing about the distress of the poor and diseased in cities all over the world" (Wherrett 1977:100-101).

Despite the absence of established responsibility for health care delivery, the Indians received medical attention from the time of earliest contact. As matters of local enterprise, for social, economic and humanitarian reasons, long before an organized Indian authority was established, missionaries and military forces gave the Indians medical attention as did some communities and commercial organizations such as the Hudson's Bay Company (Graham-Cumming 1967:121-122).

Medical care for the Indians was left in the hands of local organizations until 1904 when Dr. P.H. Bryce was appointed the first Chief Medical Officer for the Indian Department (Young 1984:258). This move reflected a growing awareness of the seriousness of the Indians' health situation, in addition to a fear of adverse public criticism (Maundrell as cited in Graham-Cumming 1967:124)

Dr. Bryce, a pioneer in the public health movement in Canada, had been the Secretary of the Ontario Provincial Board of Health for 22 years prior to his federal appointment. After touring the Prairie Indian residential schools and finding them a

breeding ground for tuberculosis (Young 1984:258) he set up "tent sanatoria" on several Ontario reserves with trained nurses in charge (Wherrett 1977:105).

In his attempt to lead a national campaign for Native health services, Bryce reported to the Department on the critical situation of Indian health. His enthusiasm, however, culminated in his early retirement (Hodgson 1982:504) in 1913 when his services were deemed no longer needed. Bryce retained his position, in name only, with Indian Affairs until his retirement in 1921¹ (Young 1984:259).

Although his efforts to establish health services were impeded by the laissez-faire attitude of the Indian department to health concerns (Hodgson 1982:504), Bryce laid the foundation for the development of medical services for the Indians of Canada. He introduced health education for Canadian Indians, with circulars on the subject of tuberculosis translated into Cree; he initiated a number of studies on the occurrence of tuberculosis in Indian residential schools (Wherrett 1977:105); he distributed a "Book of Regulations" for medical services to Indian agents; and he introduced the idea of employing local physicians to care for reserve Indians. For example, in 1916, in the Duck Lake Agency in Saskatchewan, Dr. Montreuil was retained at a wage of \$300 per annum to attend to the local Indians. The doctor's duties included monthly visits to the reserves in the agency and attending to Indians requiring treatment (both reserve residents and visitors); being available for emergency services; and submitting monthly reports to the Department (PAC RG10, Vol.9130 f.20-99).

¹ In a publication in 1922 Bryce took his appeal to the public. "The Story of a National Crime: An Appeal for Justice to the Indians of Canada" outlined his efforts to improve the Indian's health and how he was met with hostility by an apathetic government (Young 1984:259).

Dr. Bryce's post with the Indian Department remained vacant until 1927. In the interim, additional medical personnel were hired, the first Indian hospitals were built,² and health surveys were conducted (Young 1984:259). In 1922, travelling field nurses were hired to educate Indian women in hygiene and child care (Canada. Dept. of Indian Affairs Annual Report Annual Report 1928/29:8-9), and during the summers of 1926 and 1927 Indian Affairs funded the Canadian Tuberculosis Association and a Special Committee to carry out a survey of tuberculosis among the Indians of British Columbia (Canadian Tuberculosis Association Bulletin March 1926 Vol.4(3):3).

In 1925, Dr. M.M. Seymour, the Deputy Minister of Public Health for the Province of Saskatchewan encouraged the Minister of Public Health, Dr. J.M. Uhrick to provide the Ile a la Crosse area population with a hospital and medical attendant. He secured the funding from the Department of Indian Affairs to build and furnish the 25 bed centre. The administration of the hospital which opened in 1927 remained in the hands of the Catholic mission that had been on the site since 1846 and all revenues from the facility were turned over to the mission. Responsibility for the physician's salary was jointly shared by the Provincial Health Department and the Department of Indian Affairs. In addition to a physician who had been hired in 1925 when the hospital opened, it was staffed by three Grey Nuns who were nurses and one lay nurse. For the next 30 years, the hospital was run by two dedicated physicians, Dr. G.F. Amyot (1925-36) and Dr. P.E. Lavoie (1936-1953) (Saskatchewan Archives, Papers of Dr. P.E. Lavoie, File 1 and File 10b; Canada. Dept. of Indian Affairs Annual Report Annual Report 1928-29:8-9).

Except for cooperating in one or two joint ventures due mainly to local initiatives, such as the Ile a la Crosse hospital, during this time period, the thrust of Indian Affairs

² As early as 1918, a physician in the Battleford Agency in Saskatchewan suggested that a sanatorium for Indians should be built at Battleford (PAC RG10 Vol.1105 p.193).

"medical services" to the Indians was comprised mainly of health education and the distribution of circulars on health-related matters. For example, in 1911 a circular was sent from J.D. McLean, Assistant Deputy and Secretary, Department of Indian Affairs to all teachers in Indian Schools. The "Memorandum for the Guidance of Teachers in Indian Schools" stated: "It is now recognized that tuberculosis, that dread disease to which so many fall victim, is curable in its early stages and its spread preventable. Fresh air, nourishing food and clean and sanitary homes are the essential preventives" (PAC RG10, Vol. 1392, p.67).

Although the impact of these circulars on the health status of the Indians is impossible to measure, they illustrate Department policy and the federal perspective regarding Indian health which persisted through the first several decades of this century. For example, a 1918 circular sent to agents regarding their annual report submissions, outlined specific health information to be included. "A brief statement should be made with regard to the health of the Indians, and, if there has been any epidemic of a serious nature, the circumstances in connection therewith should be reported" (PAC RG10, Vol. 1392 p.329). A few days later, on April 11, 1918, a circular was also dispatched to agents from the Office of the Indian Commissioner in Regina suggesting changes to monthly reports, regarding addition of reporting health conditions (PAC RG10, Vol. 1392 p.334).

These memoranda were sent only months before the outbreak of the 1918 influenza epidemic in Saskatchewan in November of that year.³ Like most of the "relief" health services characterizing this era, these memoranda appeared in response to a specific health problem. Since the epidemic was taking an immense toll world wide, it was likely known that it would have a devastating effect on Canada's indigenous population.

³ Agents diaries and matrons reports for the period of the epidemic in Saskatchewan, beginning in November of 1918, attest to the horror of the epidemic.

Throughout the course of this influenza epidemic, agents continued to receive correspondence regarding handling of the situation locally, and authorizing them to take any steps deemed necessary to deal with the epidemic on the reserves including: closing day schools and establishing quarantine (PAC RG10, Vol. 1392 p.402).

Following the severe devastation on Indian reserves caused by the influenza, in January of 1919 yet another circular reached agents: "In view of the number of Indian children made orphans by the recent epidemic of influenza, who will have to be provided for, it is the wish of the Department that no children, whose parents are alive should be admitted to residential schools, unless under very exceptional circumstances, as long as there are orphans of this class to fill the vacancies" (PAC RG10, Vol. 1392 p.427).

After the epidemic of influenza abated, concern for the health of the reserve Indians did not subside, though circulars appeared to remain the main mechanism in the battle. Circulars regarding sanitation and "Special Precautions against the Spread of Consumption" were distributed to agents for the next several years. (A copy of this circular is provided in Appendix F).

In 1927 the post of General Medical Superintendent of Indian Affairs was filled by Colonel E.L. Stone (Young 1984:259), and a defined "Medical Branch" was created (Canada. Dept. of Indian Affairs Annual Report 1928/29:7). Colonel Stone was aware of the problem of Indian tuberculosis from his earlier work in Norway House Agency (Stone, 1925) (Wherrett 1977:106). Department regulations at the time of Stone's work stipulated that no child infected with tuberculosis was to be admitted to schools. Had he adhered to these regulations Dr. Stone reports that he would have been obliged to refuse admittance to every child (Wherrett 1977:107).

At the time of Colonel Stone's appointment in 1927, across Canada the department employed seven full time doctors, four Indian agents who were doctors, five travelling nurses and a number of field matrons. Physicians who lived near reserves

continued to be employed on a part-time basis (250), and doctors were dispatched into remote areas once a year with the Indian Agents at treaty time (Canada. Dept. of Indian Affairs Annual Report 1927:9). In northern Saskatchewan, for eighteen consecutive summers, Dr. Lavoie, the physician at the Ile a la Crosse hospital from 1936-1953, accompanied the treaty officials (Saskatchewan Archives, Papers of Dr. P.E. Lavoie, File 18).

In his position at Indian Affairs, Stone took on the task of educating and mobilizing public opinion in favour of health services for Indians. With the cooperation of Dr. Bryce, as well as representatives of provincial organizations from Alberta, Saskatchewan, and Manitoba (such as Dr. Ferguson), a committee, instituted by the executive council of the Canadian Tuberculosis Association and financed by the Department of Indian Affairs, was struck in 1924, to investigate the Indian tuberculosis problem (Wherrett 1977:108-109).

At the Department of Indian Affairs, Stone also drew up public health regulations which defined the powers and responsibilities of Indian agents and departmental physicians in the handling of outbreaks of communicable diseases; he vigorously attacked the Indian tuberculosis problem through expanded services and staff; he set into action numerous surveys and studies; and he started planning for an active anti-tuberculosis campaign, for which no funds were available (Canada. Dept. of Indian Affairs Annual Report 1930:10). In fact, all of his initiatives were hampered by the lack of available money for health care (Graham-Cumming 1967:126): "Throughout the 1920s and 1930s the provision of adequate health services was hindered by a chronic lack of funds" (Young 1984:259). Although modern health services for the Canadian Indians "may be considered as commenced in 1927" (Canada. Dept. of National Health and Welfare Annual Report 1948:40; Graham-Cumming 1967:125) the development of those services over the next decade and a half was characterized by constant setbacks in response to the

economic climate of the country.

Stone (1935) outlined Indian Health Administrative procedures followed by the department in the 1930s:

The medical officer is responsible to the agent. Although he is seldom required to consult the agent before attending a sick Indian, the medical officer must consult the agent before admitting an Indian to hospital and he cannot send a patient to the sanatoria without the approval of the department in Ottawa. He is required to report communicable diseases to the agent, and the agent to Ottawa by telegraph - he seldom fails to do so. Once proper notification is obtained the officer can then apply quarantine or other control measures. The Department reserves the right to designate the doctors who may attend the Indians (Stone 1935:84).

Despite a chronic lack of funds, in the 1930s Indian Department health services expanded. For example, in 1930 a survey of eye diseases among the British Columbia Indians was carried out at the request of the Department (Canada. Dept. of Indian Affairs Annual Report 1930:8). In 1930 the Department employed an increasing number of Public Health nurses (Canada. Dept. of Indian Affairs Annual Report 1930:10), and the first nursing station was opened in Fisher River, Manitoba (Young 1984:259). In the fiscal year ending March 31, 1931 the Department's health expenditures of roughly one million dollars meant that just under ten dollars was available to spend on health services for each Indian in Canada (Canada. Dept. of Indian Affairs Annual Report 1930:10). The impact of these increased services, however, is not reflected in a reduced death rate through this period.

Stone's tenure at Indian Affairs in general saw little more than continued and increasing 'interest' in the tuberculosis problem in the Indian population. For example, in light of Stone's findings among the Indians in Manitoba, during the summers of 1926 and 1927 Indian Affairs commissioned the Canadian Tuberculosis Association to carry

out a survey of tuberculosis among the Indians of British Columbia (Canada. Dept. of Indian Affairs Annual Report 1928/29:7), and in 1928, the Saskatchewan Anti-Tuberculosis League spearheaded a project in the Qu'Appelle Indian Health Unit with the participation of the National Research Council (Ferguson, 1928).

The Indian tuberculosis problem was brought to the attention of the world in 1928 when Dr. Ferguson presented the preliminary results of his survey at an international conference on tuberculosis. However, the extension of Indian health activities continued to be hampered by economic conditions (Canada. Dept. of Indian Affairs Annual Report 1931:8). In fact, some services were cut. "It has been found necessary to eliminate the services of three nurses and a number of field matrons for reasons of economy" (Canada. Dept. of Indian Affairs Annual Report 1931:10). During the year ending March 31, 1933, funds provided by parliament for medical services declined by 20% from previous years, and in 1934, the medical service branch of the department reported that it had "reduced its outlay in the last four years to an aggregate amount of nearly half a million dollars" (Canada. Dept. of Indian Affairs Annual Report 1933:11). Although the research project in the Qu'Appelle Valley continued, the 1929 economic crash put an end to anything of substance that may have been developing out of Stone's interest in Indian tuberculosis program expansion in Canada (Wherrett 1977:109).

At a conference of provincial health ministers, in 1934, the Indian tuberculosis situation was highlighted by presentations from several provincial representatives. Dr. Ferguson of the Saskatchewan Anti-Tuberculosis League had given Dr. J.M. Uhrick, the Health Minister for Saskatchewan, information outlining the results of several school surveys conducted during 1933 and recommendations for battling the tuberculosis problem. At this same meeting Mr. R. A. Hoey, the minister of health for Manitoba, presented the results of research on the racial incidence of tuberculosis in Manitoba

completed in 1932 (Wherrett 1977:109-110), indicating that the Indians who constituted only 2.1% of the Manitoba population accounted for 31% of the tuberculosis deaths (Walton 1932:2).

Regardless of the awareness of the Indian's tuberculosis problem, economic considerations remained paramount to the administrators at Indian Affairs. In a 1934 response for assistance for tuberculous Indian children from the Saskatchewan Rural Municipality of Cut Knife, A.F. McKenzie of the Indian Department wrote "The difficulty is that the financial resources of the Department for this purpose are now so small that it is impossible to admit to sanatorium more than a very small proportion of Indians who are recommended for such care. Under the circumstances the Department's only course is to reserve sanatorium treatment for those who have no homes" (PAC RG10, Vol.1015 p.211).

In 1935, Dr. Norquay, in the Battleford Agency, requested a sanatoria admission for a tuberculous child, Lena Alexander, and received the following response: "The Department is in the unfortunate position of not having sufficient funds to maintain in hospital an increased number of ordinary cases of tuberculosis. The only exception to this is cases suffering from tuberculosis of the bone". The department supplied a tent for the sick child's treatment ⁴ (PAC RG10, Vol. 1015 p.230).

Young (1988:124) suggests that the limited availability of medical services prior to the Second World War probably had little effect, if any, on the health status of the Indians. However, because measures were not introduced when the extent of the problem was known, the negative health status repercussions of cutbacks and inactivity during the depression years would be felt for the next several decades. In 1930, among the Indians of Canada, the enormity of the Indian tuberculosis problem was

⁴ Lena Alexander, 14, of Thunderchild reserve, died of pulmonary tuberculosis in 1935. In 1937 two more Alexanders from Thunderchild reserve died of tuberculosis, Mary V., age 1 year, and Mrs Alex, age 36.

acknowledged, and the solution was at hand. In that year it was estimated that among Canada's Indian population there were 5,000 active tuberculosis cases capable of transmitting the disease to others. At that time it cost approximately one thousand dollars a year to keep a person in a sanatorium (Canada. Dept. of Indian Affairs Annual Report 1931).

This suggests that had the motivation been there and had the money been available, tuberculosis in the Canadian Indians could have been eliminated. The experience of the indigenous peoples in Alaska where tuberculosis mortality was eliminated through an intensive case-finding, isolation, and treatment program in a period of about seven years, indicates that if a similar program had been implemented in Canada, tuberculosis as a major health problem for the Indians could have been greatly reduced before the end of the decade of the 1930s. The impact that sanatorium treatment would for on those Indians who were already seriously ill was still being debated in medical circles. However, the major impact of sanatorium treatment at the time, prolonged bed rest, even in the non-Indian population, was in removing infected individuals from the community. In addition, what the government could do had already been demonstrated as early as 1917. The Department of Soldier's Civil Re-establishment's comprehensive care program of tuberculous veterans demonstrated the concept of state duty and the state's responsibility for public health in financing an extremely effective organization of treatment (McCuaig 1982:55). In fact, this program to accommodate returning soldiers was the impetus for completing the first sanatorium in Saskatchewan in 1917.

Since the 5,000 Indians in 1930 were known to be capable of infecting others and were not treated or isolated from the susceptible population, and assuming they only infected one or even two other individuals, the number of tuberculous Indians through this decade at the least must have doubled or even tripled, intensifying the tuberculosis

problem in this population.

To add to the gravity of the situation, in 1937, a directive to Indian agents regarding medical care for the Indians, stressed that it was the Agent's duty to keep costs to a minimum and that no funds were to be used for tuberculosis surveys or treatment in sanatoria or hospitals of chronic tuberculosis. This was probably the lowest point in the already discouraging picture of Indian medical services indicating an utter lack of appreciation of the medical needs of the Indians (Wherrett 1977:111-112).

In response to the cutbacks in health care expenditures in 1937, the executive secretary of the Canadian Tuberculosis Association, Dr. G.J. Wherrett, sent a letter to the Director of Indian Affairs suggesting that a study be undertaken of the Indian Tuberculosis problem offering the assistance of an advisory committee in the undertaking (Wherrett 1977:112-113). The minister agreed to convene a conference of a joint committee of the Department of Mines and Resources, Indian Affairs Branch and the Canadian and Allied Tuberculosis associations to be held in Ottawa (Canada. Dept. of Mines and Resources Annual Report 1936:101-102).

This conference was held on June 23, 1937. The Indian health situation was reviewed (Wherrett 1977:114) and a number of recommendations emerged: to clear residential schools of active tuberculosis; to examine and survey the Indians on the more accessible reserves; and to isolate and treat Indians with active tuberculosis (Canada. Dept. of Mines and Resources Annual Report 1937:190). Following the joint meeting a committee met to plan for tuberculosis work to be done in the coming fiscal year. This additional work would not be done, however, until "funds become available" (Canada. Dept. of Mines and Resources Annual Report 1937:190).

It was not until the 1940s that federal health services for Canada's Indian population began to shift from an emphasis on medical relief to the provision of comprehensive services (Young 1988:90). Several factors contributed to this change in

policy. These included the availability of federal funds, the growth of social services and welfarism in Canada, indications that eradication of tuberculosis was an attainable goal, and political pressures from various groups concerned with the health and welfare of the Indians (Hodgson 1982:505).

These political pressures began as early as 1935. That year the annual meeting of the Canadian Tuberculosis Association devoted a entire session to the problem of Indian tuberculosis. As a result of the presentations in this session a strong resolution was sent to the Prime Minister and the federal Minister of Health pointing out the menace of uncontrollable tuberculosis on reserves for the surrounding population, recommending that more active measures had to be taken (Wherrett 1977:110).

In 1937, an editorial on the Indian tuberculosis problem in Canada in the Canadian Tuberculosis Association Bulletin argued that "the facilities for early diagnosis, treatment and prevention that have been used to such good advantage in the White population have never been made available for the attack on the Indian problem" and "However efficient the medical services of the Department of Indian Affairs may have been in relation to other disease they have never developed a progressive policy for the control of tuberculosis" (CTAB, March 1937; 15(3):4). In response, on April 9, 1937 discussion on the floor of the House of Commons focused on the Indian tuberculosis problem. It was resolved that a study of the situation was required, and a program for its solution needed to be developed. A joint advisory committee was formed to this end (CTAB, June 1937; 15(4):2).

Continuing to exert pressure on the government, in 1938 the Canadian Tuberculosis Association presented a brief on the economics of fighting tuberculosis to the Rowell Commission on Dominion-Provincial Relations, and stressed the need for intensive work on the Indian tuberculosis phase of the problem (CTAB, March 1938; 16(3):2). This same year saw some extension of health services to the Indians with

increased nursing services, the replacement of full-time physicians for part-time ones, and the extension of health services by appointing Medical Superintendents to a number of agencies. In addition, the Department of Mines and Resources launched a case finding program to discover and treat active tuberculosis among reserve Indians. In Saskatchewan, in September of 1939, Dr. Simes of the File Hills-Qu'Appelle Indian Health Unit, a Department employee, conducted x-ray surveys in the Qu'Appelle Valley area (PAC RG10, Vol 9133 f.80-12). During the year the department operated nine Indian hospitals across Canada, and an additional \$200,000 was made available for medical services which was used in the fight against tuberculosis (Canada. Dept. of Mines and Resources Annual Report 1938:221).

In the early years of the war, the tuberculosis death rate in the Indian population remained at 600-800 per 100,000. If more than five million dollars had been required to have an impact 10 years earlier, in 1930 when only 5000 Indians were infected in Canada, the effect of increasing the tuberculosis budget by \$200,000 was negligible.

Throughout the war years, the staff of Indian Health Services was considerably reduced, although facilities continued to be acquired. At the end of 1939 the department had over 500 beds in its own institutions (Canada. Dept. of Mines and Resources Annual Report 1940:165). As the war continued staff shortage problems remained. In 1943 the branch had to face the possibility of closing department operated hospitals (Canada. Dept. of Mines and Resources Annual Report 1943:154).

In 1944, there were 5.6 beds available per deaths from tuberculosis in Saskatchewan in the non-Indian population, and only .6 beds per death available to the Indians (Canada. Dept of National Health and Welfare 1947:55). The Canadian Tuberculosis Association, aware of the desperate need, again used their national voice to exert some influence on the government policy. They sent out a plea for an increased number of sanatoria beds, estimating that an additional 6,680 beds were needed across

Canada for the non-Indian patients, and an additional 1,390 beds were required to accommodate the tuberculous Indians (CTAB, March 1944; 22(3):7). In 1945, despite staff problems, the Branch acquired three new hospitals, reopened another, and established field nursing services in three agencies (Canada. Dept. of Mines and Resources Annual Report 1944:168).

At the end of the war, in 1945, there were 17 departmental hospitals in operation across Canada and more were being acquired (Canada. Dept. of Mines and Resources Annual Report 1946:204). Once the Directorate of Indian Health Services acquired more hospitals a rapid expansion of tuberculosis treatment facilities followed. Case finding and diagnostic services were also improved and greater use was made of existing facilities (Canada. Dept. of National Health and Welfare 1955:5). The Branch also began planning for an extensive post-war program for Indian Health Services. This plan included acquisition of several more hospitals to be used as sanatoria, establishing over 50 nursing stations on reserves, and the development of air transportation services for the North (Canada. Dept. of Mines and Resources Annual Report 1944:168).

By order-in-council P.C. 6495, the Indian Health Services Division was transferred in 1945 to the Department of National Health and Welfare (Canada. Dept. of Mines and Resources Annual Report 1945:202). This move to National Health and Welfare gave great impetus to the development of medical and public health services to Indians,⁵ and the next twenty years saw the greatest progress in Indian Health services (Wherrett 1977:114).

Much of the credit for the subsequent development of Indian Health Services

⁵ Only health services were transferred. Related areas such as housing, sanitation, education, and welfare, which seem to be the root cause of many health problems (Graham-Cumming 1967:127), remained in the Department of Mines and Resources. As well, Indian agents remained the legally designated "Health Officers" on reserves, not the medical personnel of the department of National Health and Welfare (Badgley 1973:156).

has been attributed to the determined efforts and progressive policies that Dr. Moore introduced as Medical Superintendent. In addition to obtaining hospitals for Indians, Moore cooperated extensively with provincial departments of health and voluntary agencies; he introduced a complete case finding service; he extended the preventive BCG program; and he made efforts to interest agencies outside the department in the problems facing Indians and Inuit (Wherrett 1977:114-115).

In the years following the Second World War medical services to the Indians of Canada matured into an organized, effective system under Dr. Moore's direction. The Advisory Committee for Control and Prevention of Tuberculosis among Indians, formed in 1944, with members nominated by the Canadian Tuberculosis Association and appointed by the government, met in Ottawa in 1945 to coordinate a national tuberculosis program (Canada. Dept. of Mines and Resources Annual Report 1946:204; CTAB, June 1945; 23(4):1). Recommendations made by the committee in regards to the fight to eliminate tuberculosis which were adopted included the acquisition of additional hospitals, and yearly surveys to be conducted of children and staff of Indian residential services. Other unspecified recommendations were included in the plans for the Indian Health Services division to be implemented as soon as conditions made it possible to do so (Dept. of Mines and Resources, Indian Affairs Branch Annual Report 1946:204). All of the recommendations made by the Committee were eventually implemented (Wherrett 1965:58).

Before 1945 tuberculosis case finding relied chiefly on x-ray surveys conducted in Indian residential schools by various provincial tuberculosis control units and occasional surveys on the more accessible reserves done by Department employees. With the opening of new sanatoria, new general hospitals, and improvements to travelling facilities in northern Canada, the case finding and x-ray diagnosis program was extended to all Indians and Inuit (Canada. Dept. of National Health and Welfare

1955:5). Programs also made more and more use of BCG. In addition to routine x-rays, all children in residential schools were administered tuberculin and negative reactors were vaccinated. Treatment was provided either directly through federal facilities or by arrangement through provincial sanatoria and other hospitals which were reimbursed at per diem rates. In 1940 roughly 100 Canadian Indians and Inuit were receiving treatment, by 1946 this number had risen to 999, and by the end of 1954, 2,934 Indians and Inuit were receiving care in various sanatoria. Eight departmental sanatoria were located in the Western Provinces and Ontario, the largest of these being the Charles Camsell Indian Hospital at Edmonton. Northern Indians and Inuit continued to be cared for in mission hospitals operated by religious groups (Canada. Dept. of National Health and Welfare 1955:6).

Figure 6.1 illustrates this increase in tuberculosis services to the Indians of Saskatchewan in the 1940s.

The incidence of tuberculosis in Figure 6.1, measured by notified new cases diagnosed, increased beginning in about 1938-39 when case-finding services began to expand. The rate of new cases diagnosed continued to increase until 1946, levelled off until about 1955, after which time it began to decline. In contrast to the increased diagnosis of tuberculosis in the Indians, new first admissions for treatment did not begin to increase until after 1940. The rate of new admissions peaked in 1948, and it remained higher than the pre-World War II rate until 1955. In addition, as indicated on the graph, the rate of admissions of new cases did not equal the rate of notification of new cases until 1954, when beds were available for all known tuberculosis cases in the provinces, including the north.

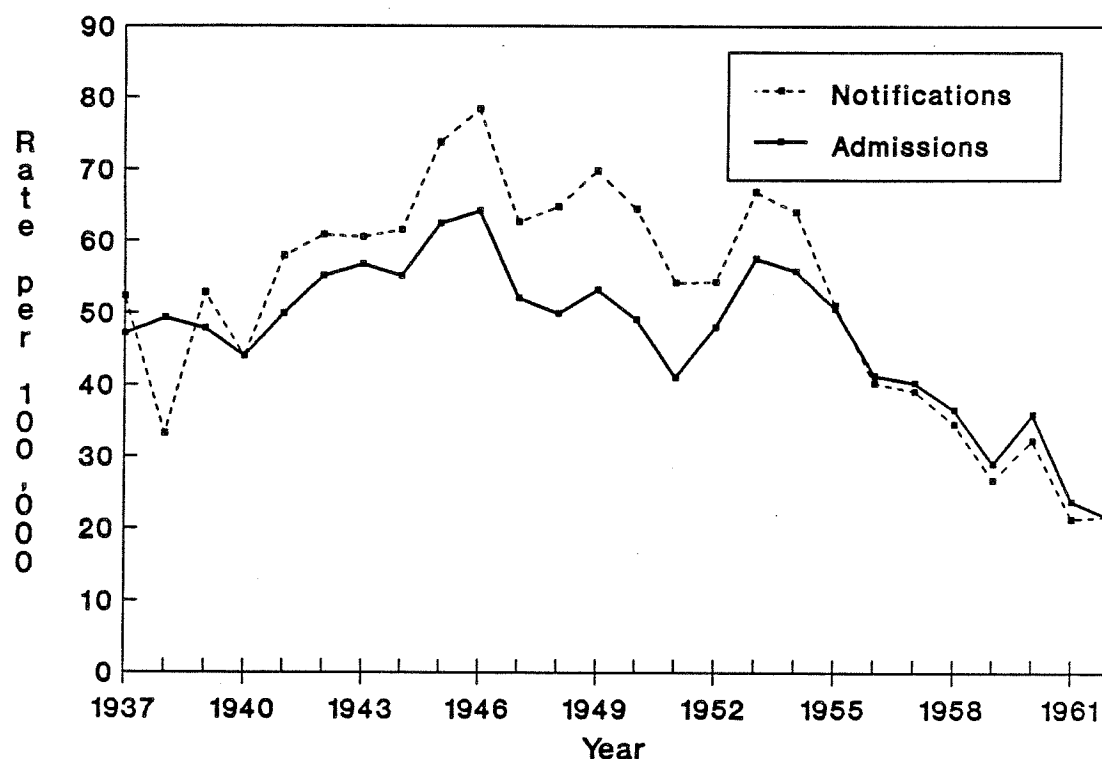


Figure 6.1 Notification of New Cases and Admissions, Tuberculosis

Saskatchewan 1937-1962. Adapted from Wherrett, G.J. Tuberculosis in Canada. A Report to the Royal Commission on Health Services, 1965; Table 5.

These data illustrate two important transition points in the delivery of tuberculosis services to the Canadian Indians. Moore (1961:1015) suggested that the first occurred following the 1937 "Conference on Tuberculosis Among the Indians of Canada", after which time case-finding of new cases began to increase; and the second with the establishment of an "Advisory Committee for the Control and Prevention of Tuberculosis Among the Indians" in 1944, whose advice the Department of National Health and Welfare used in setting up their coordinated post-war anti-tuberculosis programs.

In 1948 a Tuberculosis Control Grant, designed to enable the provinces to establish new services and to extend existing programs, was initiated as a part of the National Health Program. Through this grant approximately four million dollars per annum was made available to the provinces (Canada. Dept. of National Health and Welfare 1955:7). The amount allocated to each of the provinces was determined by population (50%) as well as on the basis of the five-year death rate from tuberculosis (50%). In Saskatchewan, from 1948-1962, 2.7 million dollars, or 97% of the grant money available was utilized in anti-tuberculosis work (Wherrett 1965:41-42).

During the 1950s, the number of Indian health facilities continued to increase. In 1951 the Department operated 80 health centres, 18 hospitals, 30 nursing stations, and employed over 1,200 full and part-time workers (CTAB, Sept./Oct. 1951; 30(1):3). In the summer of 1951, 16 departmental survey teams carried out tuberculosis surveys in Canada (Canada. Dept. of National Health and Welfare Annual Report 1951:50).

As outlined in the Department of National Health and Welfare, Indian and Northern Health Services Annual Report (1956:76) eligibility for medical treatment was determined by three considerations:

1. One must be an Indian as defined by the Indian Act;
2. One must be following an Indian way of life, living on a reserve, or off the reserve for less than one year;
3. One must be financially unable to arrange treatment themselves.

In terms of preventive services and health education, services were available to all Registered Indians on the same basis.

It became apparent throughout the 1950s that the Indians were at last winning their struggle against tuberculosis. In October of 1953 "no deaths from tuberculosis occurred among British Columbia's Indian population" (CTAB, Dec./Jan. 1953; 31(2):8). The death rate from tuberculosis in the Saskatchewan Indians, between 1951 and 1954,

decreased from over 400 per 100,000 to less than 100 per 100,000. Although deaths from tuberculosis had declined to 1951 due to the natural course of the epidemic curve, this dramatic decrease was only possible with the introduction of anti-microbial drugs to treat the disease, and intensive Indian Health Services BCG immunization programs to prevent its further spread.⁶

In Saskatchewan, at the end of 1956, when tuberculosis deaths had been reduced to 30 per 100,000, there were two department hospitals, three clinics, five nursing stations, and five health centres. The two hospitals, were at Qu'Appelle and Battleford; the nursing stations at Fort a la Corne, Lac la Ronge, Mistawasis, Onion Lake, and Pelican Narrows (Canada. Dept. of National Health and Welfare Annual Report 1956:82-84). As a result of increased use of preventive BCG vaccination, the introduction of drugs to treat tuberculosis, and the decline in the tuberculosis death rate, during the 1960s, a number of Indian hospitals were closed (Young 1984:260).

By 1962, with tuberculosis "no longer a major problem amongst Indians" (Dept. of National Health and Welfare, Annual Report, 1962:92) tuberculosis wards became obsolete and "the main focus of the anti-tuberculosis program in the 1960s was case finding, contact-tracing, and protection programs" Matas (1966:878). Program goals included obtaining a yearly chest x-ray examination for each Indian and Eskimo and those of non-native status in the Territories. The chest survey remained the most effective diagnostic tool despite the decreasing number of cases being found per thousands filmed (Matas 1966:878-879). Although case-finding was left mainly to Medical Services, provincial agencies gave varying degrees of assistance. In Saskatchewan, Ontario, Quebec and the Maritimes full use was made of provincial clinics

⁶ The role of BCG in prevention is still disputed today. Grzybowski (1983:97-98) suggests that despite its limitations in developed countries with low risk of infection, BCG is invaluable for populations with a high risk, including the Indians and Eskimos of North America.

for follow-up purposes and for day-to-day diagnostic problems. Most health centres and nursing stations were equipped with diagnostic x-ray units. Preliminary screening by tuberculin testing was not undertaken for healthy newborns but most received BCG before they left the hospital or within a month after birth (Matas 1966:880-881). In the 1960s, treatment arrangements varied from province to province depending on the position of the provinces tuberculosis control services vis-a-vis the Natives. The problem of recalcitrant tuberculosis patients was not a major concern. However, if a patient left a hospital without being discharged, and refused to return voluntarily, it was possible to invoke the "Indian Health Regulations" (Matas 1966:882), and have him forcibly returned to treatment.

By 1971, when all provinces in Canada were covered under universal medical care insurance, and Indians were included under provincial hospital services plans, virtually all Canadians became entitled to the same hospital and physician services (Young 1984:260). Where local services were not available such as in the north, Medical Services continued to operate hospitals, nursing stations, and health centres (Canada. Dept. of National Health and Welfare Annual Report 1962:79).

6.3 Tuberculosis services to the Indians

In Canada, tuberculosis control programs were conducted by the provinces. Federal participation was limited to assisting the provinces through the 1948 Tuberculosis Control Grant and to services for special groups such as Indians and Inuit (Canada. Dept. of National Health and Welfare 1955:4). Tuberculosis services to the Indians of Saskatchewan were the result of cooperation among three agencies: Medical Services Branch of Indian Affairs, The Canadian Tuberculosis Association, and, the Saskatchewan Anti-Tuberculosis League.

The development of federal tuberculosis services to the Indians of Saskatchewan is essentially the story of the development of health services, as tuberculosis was "the" major health problem until 1962. The following sections will examine the contributions of the Canadian Tuberculosis Association and the anti-tuberculosis measures undertaken by the Saskatchewan Anti-Tuberculosis League.

At the turn of the century, the development of a national tuberculosis association represented the cornerstone in the growth of a public health movement in Canada. The first organized efforts to deal with tuberculosis, the main public health problem at the time of Confederation, were made in Ontario in 1896 with the formation of the National Sanatorium Association. Within the next few years two other organizations were formed, again in Ontario. By 1900 organizers realized that the problem would have to be attacked on the national level. To this end, Dr. Peter Bryce, Dr. E.J. Barrick, and the Reverend E.S. Eby, among others, took the initiative in the organization of the Canadian Association for the Prevention of Consumption and Other Forms of Tuberculosis. In February of 1901, the National Association held its first regular annual meeting, and at the second meeting in 1902, the association was renamed The Canadian Association for the Prevention of Tuberculosis (Wherrett 1977:9,18).

In the early years the focus of the organization was on arousing public interest in tuberculosis prevention through education. By 1905 Canadians began to recognize that the federal government had a role to play in the nation's health, despite the limitation of the BNA act. Throughout the next several decades, one of the main functions of Canadian Tuberculosis Association involved lobbying the federal government, at first to take measures to aid the organization in fighting tuberculosis, and later to take an active role in combatting Indian tuberculosis.

A House of Commons resolution was passed in 1905 in response to early efforts of the Canadian Tuberculosis Association. This resolution stated: "That in the opinion

of this House the time has arrived when Parliament should take some active steps to lessen the widespread suffering and the great mortality among the people of Canada, caused by the various forms of tuberculosis" (Wherrett 1977:21). The only tangible result of this resolution was an annual grant to the Canadian Tuberculosis Association, initially \$2000, increased to \$25,000 in 1925, reduced by 10% in 1931 and 1932; it has been \$20,250 ever since (Wherrett 1977:22).

The Canadian Tuberculosis Association, (as it eventually came to be known), was a voluntary organization within which the medical profession and the public worked together to provide services for the prevention and treatment of tuberculosis in Canada. It has been the most important agency in the dissemination of information on tuberculosis diagnosis and treatment in Canada (CTAB 1962:7; Brief Submitted to Royal Commission on Health Services, 1962).

Activities of the Association over the years have included: lecturing and distributing leaflets on tuberculosis prevention, assisting in the organizing of provincial and local anti-tuberculosis organizations, maintaining an interest in professional education and tuberculosis research, and establishing anti-tuberculosis programs (Wherrett 1977:20-25). From its inception, the Association recognized the unique situation of tuberculosis in the Canadian Indian population. Over the years the associations members participated in innumerable studies, initiated and sat on many special committees, and constantly petitioned the federal government with letters and recommendations regarding the situation among the Indians of Canada.

Two prominent figures in the fight against Indian tuberculosis in Canada, G. J. Wherrett and R.G. Ferguson, were both actively involved in the operations of the Canadian Tuberculosis Association. In 1933, Dr. Wherrett took over as executive secretary of the Association. Dr. Wherrett saw that his challenges in this position included stimulating provincial tuberculosis control programs, completing the re-

organization of the National Association and its branches, and increasing awareness of the tuberculosis problem among the Indians of Canada (Wherrett 1977:27).

In 1935 Dr. R.G. Ferguson, Medical Director and General Superintendent of the Saskatchewan Anti-Tuberculosis League, became president of the Canadian Tuberculosis Association (CTAB 1935:2). Ferguson's presidential address at the 1937 Canadian Tuberculosis Association annual meeting included, among other topics, a discussion of Indian tuberculosis (CTAB 1937:2).

The arrival on the scene of drugs for tuberculosis treatment drastically changed the whole medical approach to the disease. When Dr. C.W.L. Jeanes succeeded Dr. Wherrett in 1962, the Canadian Tuberculosis Association had two outstanding problems it had to deal with: (1) The need to include all non-tuberculosis respiratory diseases, resulting in a name change in 1969 to the Canadian Tuberculosis and Respiratory Disease Association; (2) A need for greater involvement on the international level (Wherrett 1977:32).

The frontline service-givers in the fight against tuberculosis in Saskatchewan, in both the Indian and the non-Indian populations, were the volunteers and employees of the Saskatchewan Anti-Tuberculosis League.

In 1906 Dr. Maurice Seymour, Commissioner of Health for Saskatchewan, discovered that his son had tuberculosis and took him to the sanatorium at Saranac Lake, New York. As a result of this experience, Seymour realized that tuberculosis could be arrested if attended to in its early stages. In 1907, Dr. Seymour recommended the establishment of a sanatorium in Saskatchewan, and in 1911, following a meeting of eighteen leading Saskatchewan citizens, the Saskatchewan Anti-Tuberculosis League was founded. The main purpose of the League was to find ways to build a hospital for advanced tuberculosis cases and a sanatorium for the treatment of early cases. League objectives also included the education of the people of Saskatchewan regarding

tuberculosis prevention (Wherrett 1977:185; Roberts and Smith 1961:5-6).

Because a 1911 act of the provincial legislature gave the League official status, and constituted it as a corporate body, empowering the trustees to establish hospitals and sanatoria and to appoint medical and other employees to these institutions, the Saskatchewan Anti-Tuberculosis League was unique when compared to other such organizations in Canada (Wherrett 1977:186). From its inception the League in Saskatchewan was organized as a semi-official body, mainly lay and voluntary in composition and operation. A great responsibility for the its operation lay on the municipalities, and provincial local improvement districts (Wherrett and Grzybowski 1966:4-7).

In this distinctly Saskatchewan approach to the problem, the provincial government in Saskatchewan did not take as active a role as other provincial governments. The Saskatchewan government contributed to the building of the Fort Qu'Appelle Sanatorium and assumed the full cost of additions at Fort Qu'Appelle and the construction of the Saskatoon Sanatorium and the Sanatorium at Prince Albert. The federal government only provided financial assistance to the construction of the Fort Qu'Appelle Sanatorium, and did so in order to furnish accommodations for tuberculous veterans returning from the war (Wherrett and Grzybowski 1966:4-7).

The site chosen for the first Saskatchewan sanatorium at Fort Qu'Appelle in the valley on the shores of Echo Lake was chosen for its natural beauty and for its position in the centre of Saskatchewan's densest population (Robert and Smith 1961:6). By 1914 enough money had been collected and set aside for construction to begin. At this time, the League appointed their first Medical Superintendent, Dr. Wm. M. Hart, but with the onset of the war, all League activities ceased.

Returning from the war in 1917, Dr. Hart took a position in Ottawa and the League appointed Dr. Robert G. Ferguson Medical Superintendent. The return of ex-servicemen from overseas requiring treatment provided the impetus for the completion

of construction of the Fort Qu'Appelle Sanatorium (Wherrett 1977:186), which was officially opened October 10, 1917 (Roberts and Smith 1961:9).

Beginning in 1917, Dr. Ferguson devoted thirty-two years of his life to his work with the Saskatchewan Anti-Tuberculosis League and the battle against tuberculosis in Saskatchewan. Dr. Ferguson received his M.D. from the University of Manitoba and his tuberculosis experience working under Dr. D.A. Stewart (CTAB, 1935). His achievements through the years won him world wide acclaim and recognition, and under his guidance Saskatchewan has led the way in numerous tuberculosis studies and programs (Roberts and Smith 1961:9). Throughout the Ferguson years of the League, anti-tuberculosis work in Saskatchewan progressed at an unprecedented rate. Treatment, case finding, prevention and patient services, as well as services to the province's Indian population, evolved simultaneously (Wherrett 1977:187).

In order to evaluate the extent of tuberculosis in Saskatchewan, in 1921, the Provincial legislature passed an order-in-council appointing a Royal Commission of inquiry (Ferguson 1922:1; Wherrett 1977:187). The purpose of the commission was to determine the prevalence of tuberculosis and to make recommendations for treatment and prevention (Roberts and Smith 1961:28). Surveys were conducted among school children, indigent families, Indian children (See Ferguson 1922) and ex-sanatorium patients; and investigations were made of tuberculosis mortality, hospitals, and public health nursing services (Campbell 1953:164).

Two of the thirty recommendations in the Commission Report related to the Indians. The report requested that the federal government survey the Saskatchewan Indian population further to determine their infectivity. In addition, it recommended that the federal government make provisions for the hospitalization and treatment of tubercular Indians (Larmour 1987:22). Some Indians were being treated in the sanatorium, but Dr. Ferguson recognized that the Indian population represented a pool

of infection that had to be eliminated by the isolation of tuberculous Indians. The report's disclosures and recommendations regarding the almost total tubercularization of the Indian population sampled were so startling and informative that they led to demands that similar surveys be taken in other provinces (Campbell 1953:164).

The findings of the Commission formed the basis for the long-range preventive program which began in the province of Saskatchewan in 1922 (Saskatchewan Health Survey Report 1951:109). A tuberculosis survey of 1,346 school children in the province was undertaken by the League as part of the Commission's inquiry. In total the study involved 162 Indian children, and 1,184 Whites.

It was found from the incidence by nationality that the Indian children showed a very high percentage of infection
 - 93.1%, compared with the average for other racial origins
 - 54% (Ferguson 1922:2).

Following the Commissions' disclosures regarding Indian tuberculosis, the Anti-Tuberculosis League cooperated on an ongoing basis with the federal Indian department on matters dealing with Indian tuberculosis. For example, in 1927, Dr. R.G. Ferguson visited the Colony Hospital at the File Hills Reserve, and reported to the department on the conditions there, suggesting the facilities for tuberculosis treatment were adequate (PAC RG10, Vol. 9143 f.2).

Saskatchewan was forever on the forefront of the battle against tuberculosis with one of the most important studies (Ferguson 1928) investigating tuberculosis among the Indians living in the Qu'Appelle Valley (Wherrett 1977:188). Dr. Simes, who had been conducting a baby clinic on the File Hills Indian reserve since 1924, cooperated with Drs. Ferguson and Kirkby in examining the Indian children for the study (Larmour 1987:23) (See Ferguson 1928).

In another innovative move in the fight against Indian tuberculosis, in 1927 Dr. Ferguson, accompanied by J.M. Uhrick (Minister of Health) and Dr. M.M. Seymour (Deputy Minister of Health), travelled into northern Saskatchewan. Starting from Big River the trio went by canoe and on foot as far as the Indian school at Lac la Plonge, where Ferguson examined the children. Dr. Ferguson was involving the Department of Health in finding ways to expand services even before such expansion was anticipated (Larmour 1987:18; Valley Echo, Sept. 1927:21).

The research that Dr. Ferguson had undertaken on Indian tuberculosis led to the establishment of the Qu'Appelle Indian Health Unit in 1928, with Dr. A.B. Simes as superintendent (Larmour 1987:39). The health unit, a cooperative effort between the Department of Indian Affairs, the National Research Council and the Saskatchewan Anti-Tuberculosis League, was an experimental unit in which anti-tuberculosis case-finding and treatment measures used among the non-Indian population were applied to the Indians (Roberts and Smith 1961:49). When established, the unit had one doctor, a public health nurse and a hospital to provide care to approximately 1400 Indians from the File Hills and Qu'Appelle agencies. After four years of operation the tuberculosis death rate in these two Indian groups had been cut in half (Dept. of Indian Affairs, Annual Report, 1932:14). Specific anti-tubercular measures employed in the unit included the preventive BCG of Indians Infants Case-Control study (Ferguson and Simes 1948) and specific treatment measures including: heliotherapy (sun therapy); the use of Carbon Arc-Light therapy for the treatment of glandular tuberculosis (the "lamps"); body casts for patients with tuberculosis of the spine; and rest, good food, fresh air and controlled exercise (Larmour 1987:19,36; Wherrett 1965:58).

In 1929 Saskatchewan became the first province to provide free tuberculosis treatment to all residents; the cost was met through taxation (Wherrett 1977:187). This was perhaps the greatest achievement in the 50 years of the League (Roberts and Smith

1961:43). This free treatment, however, was not extended to the Indians in Saskatchewan. Because they were not the responsibility of the province, cost for treating tuberculous Indians remained the responsibility of the federal department of Indian Affairs. It was some time before responsibility for this cost would be realized without question by the federal government (Wherrett 1977:108).

From the outset, some Indians received treatment in the provincial sanatoria (Wherrett 1977:108). Between 1919 and 1934, 124 Indians in Saskatchewan received treatment in provincial sanatoria (an additional 11 had been admitted, but had run away). In terms of total operations of the League, this number of Indian patients was not significant. In the 1935 follow-up study of discharged sanatoria patients, it was found that more than two-thirds of the 124 who had received treatment had died, as compared to one-third of the non-Indian tuberculous population who had been treated (Fort San File "1935 F.U. Report of Indians and Untreated Patients").

The main sanatorium treatment, before the introduction of anti-microbial drugs to treat tuberculosis, consisted of rest, good food and fresh air. In the sanatoria patients had to follow a very strict routine. The patients day began at seven o'clock with breakfast at eight. Those whose conditions allowed them went to the dining room, others had trays brought to their beds. Following breakfast patients returned to their room, except for Mondays when they had to be weighed. From nine until ten-thirty patients "took the cure", on their beds or out in the sunlight on the porches. Following the rest period, patients who were allowed exercise took the amount prescribed to them by their physician. This exercise consisted of walking, beadwork, light carpentry or other hobbies and crafts. Lunch was served at one o'clock. Patients were advised to rest for at least half an hour before each meal. Ample wholesome and nutritious food was available to the patients and they were encouraged to freely drink the milk. The afternoon rest and exercise was the same as the morning. Just before three, all patients

took their temperatures which were recorded by the nurses. Dinner was served at six, and after dinner, patients in relatively good shape were allowed to play cards or billiards for a limited time, go for walks or do beadwork. The sanatorium library remained open from six-thirty until seven-thirty. Patients had to be in in bed by nine-thirty (Larmour 1987:20).

In addition to provision of school work for children, life in the sanatoria was augmented throughout the decades by various activities for the patients intended to make them pleasant, hopeful and almost homelike places. A sanatorium entertainment committee, made up of staff and patients, arranged parties at Halloween and Christmas for the patients, and early in Fort San's history a patient dramatic club entertained. Travelling professional entertainers such as the RCMP Musical Ride also visited the sanatoria through the decades (Larmour 1987:11,27-28).

In 1933 Drs. Ferguson and Simes embarked on a major study of the efficacy of BCG vaccination, the first such study undertaken in Canada. The longitudinal case-control study extended over a period of 14 years involving Indian babies born between 1933 and 1945 in the Fort Qu'Appelle Indian Health Unit (Ferguson and Simes 1949; Larmour 1987:39). The study conclusively demonstrated that BCG provided valuable protection against tuberculosis. In fact, the study was so successful, and the results so conclusive, that the BCG vaccination program was adopted by the Department of Indian Affairs, and later by the Indian and Northern Health Services of the Department of National Health and Welfare (Wherrett 1977:189).

Table 6.1 highlights some benchmark events in the history of the Saskatchewan Anti-Tuberculosis League throughout its 75 year existence.

Table 6.1 Activities of The Saskatchewan Anti-Tuberculosis League

1911	The Saskatchewan Anti-Tuberculosis League was founded and an Act of the Saskatchewan provincial legislature gave the League official status
1914	Construction of the Fort Qu'Appelle Sanatorium began, and Dr. Wm. M. Hart was appointed first Medical Superintendent
1917	Dr. Hart resigned and Dr. R.G. Ferguson was appointed Medical Superintendent; The Fort Qu'Appelle Sanatorium was opened
1919	The Sanatorium Magazine, the "Valley Echo" was first published
1921	The Saskatchewan Provincial Legislature passed an Order-in-Council appointing a Royal Commission inquiry into tuberculosis in Saskatchewan
1922	Saskatchewan's long range tuberculosis preventive program began and the idea of free tuberculosis treatment was initiated
1924	Ownership of the sanatorium at Fort Qu'Appelle was transferred to the province of Saskatchewan and a travelling consultation service for family physicians was established
1925	The second Saskatchewan sanatorium opened in Saskatoon
1929	Saskatchewan became the first province in Canada to provide free tuberculosis treatment to all residents
1930	The third Saskatchewan Sanatorium at Prince Albert opened
1932	Volunteer teachers began to provide instruction to sanatorium patients
1934	The first sanatorium school was organized, utilizing provincial correspondence school courses
1938	Dr. Ferguson introduced BCG to protect student nurses in the three Saskatchewan sanatoria
1941	Saskatchewan conducted the first mass x-ray survey in Canada

- 1948 Nurse training in sanatoria began at Fort San; the general hospital admissions chest x-ray program began; and Dr. Ferguson retired
- 1951 The Saskatchewan Health Survey Report was released and the third complete x-ray survey of the province began
- 1961 The Prince Albert Sanatorium was closed and the golden anniversary of the League was celebrated with the distribution of a booklet on the Leagues first fifty years "The People Versus the White Plague"
- 1963 Due to decreasing demand for inpatient beds for tuberculosis patients, the sanatorium at Saskatoon began taking in geriatric patients
- 1966 "Report and Recommendations on Tuberculosis in Saskatchewan" was received
- 1972 The sanatorium at Fort Qu'Appelle was closed
- 1973 The mandate of the Saskatchewan Anti-Tuberculosis League was broadened to include other respiratory illnesses; and the League established a respiratory disease unit at the University of Saskatchewan in Saskatoon and a position in the Department of Medicine known as the "Dr. George Ferguson Professor"
- 1977 The tuberculosis floor at the Saskatoon Sanatorium was closed
- 1981 The League was renamed the Saskatchewan Lung Association
- 1982 Dr. G.D. Barnett the last Medical Superintendent of the Saskatchewan Anti-Tuberculosis League retired
- 1987 Anti-tuberculosis activities in Saskatchewan were transferred from the Lung Association to the Saskatchewan Department of Health, Communicable Diseases Branch

(Roberts and Smith 1961; Wherrett and Grzybowski 1966; Wherrett 1977; Larmour 1987)

Throughout the 1930s, Dr. Simes, employed by the Indian Department, and Dr. Ferguson, at Fort San, worked in close collaboration, and the League with the financial assistance of the Department of Indian Affairs conducted surveys of Indian schools and active cases were removed (Larmour 1987:39-40). In a 1933 survey of Delmas residential school, Dr. Ferguson found 6 children with incipient pulmonary tuberculosis lesions, and 4 children who were "spreaders"; he recommended their removal from the school to prevent further dissemination among the healthy children (PAC RG10, Vol.1015 p.507-508).⁷ Regular reserve surveys began in 1939 (PAC RG10, Vol.9133 f.80-12), and regular surveys of Indian boarding schools, day schools and reserves continued through the next decade (Larmour 1987:48). Despite financial constraints in the 1930s, the League also made efforts to branch into more northern communities in Saskatchewan. In 1935 Dr. C.H. Andrews flew with the regular mail flight into Ile a la Crosse. Dr. Lavoie had 15 patients waiting to be examined; of these one had to be taken to the sanatorium. In 1937, the first tuberculosis survey of northern Indians was carried out by the League and the Department of Indian Affairs. They found that 85% of those surveyed were infected (Larmour 1987:40).

Throughout the depression years of the 1930s, advances were made in the fight against tuberculosis in Saskatchewan, and the League, with the cooperation of the federal Indian Affairs department, believed that they were attacking the pool of infection among the Indian people of the province (Larmour 1987:45). These early League initiatives in Saskatchewan, however, are not reflected by decline in the tuberculosis death rate. The mortality curve for tuberculosis in Saskatchewan continued to parallel the curve for the rest of Canada throughout this time period. In Saskatchewan through the 1930s the Indian tuberculosis death rate remained between 600 and 800 per 100,000 and the

⁷ Of these four children removed from the school, one subsequently died of tuberculosis in 1934, in Fort San, Gabriel Albert.

Canadian figure (See Wherrett 1977:252) was about the same. In the demonstration unit at Fort Qu'Appelle, however, where organized anti-tubercular measures were provided to the Indians, the death rate from tuberculosis was much lower than the provincial Indian rate, remaining around 250 per 100,000 throughout most of the decade. This suggests that the Indians of Saskatchewan would have benefitted from services such as those that were in place in the Fort Qu'Appelle demonstration unit, however, these were not available to all the Saskatchewan Indians. It also indicates that identification of the tuberculosis problem through surveys was insufficient. Increased cooperation from the federal department was required both in isolating and treating tuberculous Indians and in initiating preventive activity.⁸

In 1948 nurse training in sanatoria began at Fort San (Wherrett 1977:190), and the general hospital admissions chest x-ray program began (Saskatchewan Health Survey Report 1951:111). By this time, a coordinated tuberculosis program for the Indians at the federal level, had been initiated and with the new Indian hospital in North Battleford, the Indian hospital at Fort Qu'Appelle, and empty beds in all three provincial sanatoria, accommodation was available for all "known" Indian tuberculosis cases in Saskatchewan. In the southern part of the provinces regular surveys were made on Indian reserves, but in the north only intermittent visits were possible. It was not until the decade of the 1950s that the League was able to begin an intensive program in the remote north of the province (Larmour 1987:48).

Dr. Ferguson retired from his position with the Saskatchewan Anti-Tuberculosis League in 1948. That year at the League's annual meeting Dr. Ferguson advised the League that it must continue to cooperate with the Indian Department in their program to fight tuberculosis for "unless the tuberculosis problem among the Indians is solved, the

⁸ The follow-up survey done in 1935 indicated that 2/3 of the tuberculous Indians who received sanatorium treatment died, indicating that prevention continued to be more important for the Indian population than treatment.

tuberculosis problem of the provinces will not be solved" (Larmour 1987:60,61).

Following Dr. Ferguson's retirement, the League's work in Indian tuberculosis continued. While they expanded the case finding program in the late 1940s, fresh impetus was given to the examination of the Indians in the province by the federal government. In 1948 there were about 15,500 Indians in the province. In that year 3,975 were examined. The program, initiated by Indian Health Services, was extended in 1949 in cooperation with the Saskatchewan Anti-Tuberculosis League, and in that year almost half of the Indian population of the province was reached (Saskatchewan Health Survey Report 1951:110).

In the 1951 "Saskatchewan Health Survey Report", the League's preventive BCG vaccination program is highlighted. Groups regularly vaccinated in Saskatchewan included high risk groups such as tuberculin negative sanatoria employees, tuberculin negative nursing students, tuberculin negative mental hospital employees, tuberculin negative Indians on reserves, Indian infants in the Qu'Appelle Indian Health Unit, and tuberculin negative members of contact families. Vaccination of members of Metis communities was to begin in the near future (Saskatchewan Health Survey Report 1951:113). Preventive services carried on by the Saskatchewan Anti-Tuberculosis League, in 1949-1950 included the x-ray examination 12,261 Indians on reserves and in residential schools (6715 or 41% in 1949, and 5546 just over 30% in 1950) (Saskatchewan Health Survey Report 1951:114).

Of the 803 sanatorium beds available in Saskatchewan in 1950, 120 were available for the Indian population of the province. In addition, about 50 beds in the federal Indian Hospital at Fort Qu'Appelle were available for tuberculous Indians, making a total of 170 beds available to Indian patients in the province. Saskatchewan was one of the few provinces in 1950 with no waiting list for beds for the non-Indian population, however additional beds were still required to meet the needs of the Indian population from the

remote reserves in northern Saskatchewan (Saskatchewan Health Survey Report 1951:115).

One of the seven recommendations made in the 1951 Saskatchewan Health Survey Report dealt with tuberculous Indians. The report recommended that "emphasis on care of Indians and the accommodation of an increasing number of Indian patients in the sanatoria (in addition to expanded facilities for tuberculous Indians in the hospitals of the federal Indian Health Service) should be continued until the needs of Indians are fully met" (Saskatchewan Health Survey Report 1951:120).

In Saskatchewan, in the 1950s, with financing from the federal government the League expanded its work in the north (Larmour 1987:62), mainly through increased preventive activities. Since the League's first venture into northern Saskatchewan in the 1930s, the need to expand the tuberculosis program there was recognized. Services to the north, however had been hampered by poor travelling conditions, and doctors and nurses rejecting the north's harsh way of life. It was not until 1952 that Dr. John Orr found a solution to the problem in the person of Josephine Walz (Larmour 1987:65-66). In 1953 Nurse Walz was asked to do two years work in the north for the Anti-Tuberculosis League (Roberts and Smith 1966:63); she stayed for the next 11 years, conducting tuberculin surveys and administering BCG vaccinations (Larmour 1987:66). At this time the League gave BCG to newborns wherever there were outpost hospitals in the north.

In 1953 x-ray equipment was installed in St. Martin's hospital in La Loche, with films being sent to the Sanatorium at Prince Albert for reading and interpretation (Larmour 1987:66). In the next year the League installed x-ray units in three other northern centres: Sandy Bay, Buffalo Narrows, and Cumberland House. Earlier it had placed a unit at Ile a la Crosse (Larmour 1987:66; Canada. Department of National Health and Welfare 1955:53). In 1956 the League undertook, for the first time, a full-

scale survey in Uranium City. Special surveys continued each year in a few centres. The League was finally able to establish a preventive presence in the north (Larmour 1987:66). As the 1950s concluded and the preventive program became more effective there were fewer patients to fill the three sanatoria and seven tuberculosis patients from the Yukon arrived to occupy empty beds at Fort San (Larmour 1987:64).

The fight against tuberculosis in Saskatchewan appeared to have been won by the early 1960s. Among Saskatchewan's Indian population, tuberculosis deaths and new cases continued to decline, yet, tuberculosis remained a problem. Although mortality was nearing the rate in the general population, morbidity in the Indians remained ten times greater than in the rest of the province. Examining contacts of a case diagnosed in 1959, League employees found 25 new cases.

During 1962 the League treated more cases outside the sanatorium than in. In July 1965 under a new agreement with the federal government, the League took over full responsibility for care and follow up treatment of tuberculous Indians in Saskatchewan. This agreement expanded the League's work in the north, and in 1965 a clinic was opened in La Ronge (Larmour 1987:78-79). In 1967 the League established clinics at La Loche and Ile a la Crosse, and in 1968 at Loon Lake and Sandy Bay (Larmour 1987:79).

In the early 1960s, Dr. G.D. Barnett, General Superintendent for the League, requested that a study be undertaken to guide the League in its future in Saskatchewan. He commissioned Dr. G.J. Wherrett, Tuberculosis Consultant with the Department of National Health and Welfare, and Dr. Stefan Grzybowski, an epidemiologist and associate professor at the University of British Columbia Medical School to do the study. The purpose of the commission was to examine League programs for prevention and treatment, as well as League administration, methods of finance, the role of health region personnel, and the League's role in education. The report was received in 1966. One of several recommendations was that the League take over responsibility for the

treatment and prevention programs for the Indians of the province. In fact this had already occurred in 1965 (Larmour 1987:83).

Activities of the Anti-tuberculosis League wound down in the late 1960s and into the 1970s, although work among high risk populations continued. In a 1967 paper, E. Casselman, the Zone Nursing Officer, Medical Services, Battleford Zone, pointed out that in 1967 nearly 100% of the zone's school children were vaccinated with BCG (Casselman 1967:545). In the 1970s the League gave the Indians continued attention via a two year cycle of testing and vaccination of children in Indian and integrated schools. In 1976 local hospitals took over responsibility for testing and the results were sent to the League to be read (Larmour 1987:91).

Throughout the later half of the 1970s, the League's role in Indian health gradually declined. In 1973 Indian Health Services appointed a tuberculosis nurse in each health region of the province and in 1975 these nurses took over all responsibility for the Indians, leaving the League in a consulting position. In 1976 the scope of surveys on Indian reserves was reduced (Larmour 1987:92).

As the League's activities in tuberculosis decreased, it ventured into new fields through a gradual transition process. In 1973 the mandate of the League was broadened to include other respiratory illnesses, and a respiratory disease unit was established at the University Hospital in Saskatoon. The League financed a position in the Department of Medicine known as "The Dr. George Ferguson Professor" (Larmour 1987:92-93).

In 1981 the Saskatchewan Anti-Tuberculosis League became known as the Saskatchewan Lung Association and many internal organizational changes took place. Dr. Barnett, the last General Superintendent and Director of Medical Services for the Saskatchewan Anti-Tuberculosis League retired in 1982 (Larmour 1987:101-102). After this time tuberculosis held a minor but still important position in the Association's mandate. Dr. Barnett's work on the tuberculosis problem among Saskatchewan's Indian

population did not cease with his retirement. Until 1986, when he handed his data over to Dr. V. Hoepfner, he continued to update the statistics on Indian tuberculosis mortality and morbidity in Saskatchewan.

In 1986 anti-tuberculosis work in Saskatchewan was carried out for the most part, by three dedicated individuals. Dr. Ed Ring, a League employee for decades, continued his responsibility for x-ray diagnosis of chest films. Nurse coordinator Jean Graham (who had been with the League since 1962) remained responsible for coordinating all tuberculosis treatment activities and nurse education (Larmour 1987:104), and maintaining a complete case registry of all active cases of tuberculosis in the province.⁹

The third individual, Dr. V. Hoepfner was appointed Director of Tuberculosis Control in January 1986. Aware of the continuing tuberculosis problem in Saskatchewan's north, Dr. Hoepfner's main emphases became case finding (Larmour 1987:104) and tuberculosis epidemiology. The data on Indian tuberculosis collected for decades by Drs. Ferguson and Barnett, now became an important focus of the tuberculosis research in which Dr. Hoepfner became involved.

In the summer of 1987, anti-tuberculosis activities were transferred to Saskatchewan Department of Health, Communicable Diseases Branch. Dr. Greg Horsman is currently the Director of the Provincial Tuberculosis Program. Dr. Hoepfner retained his position, funded by the Saskatchewan Lung Association, as the Dr. George Ferguson Professor of the College of Medicine, University of Saskatchewan. The Lung Association continues to be involved in tuberculosis education programs, and funding the Dr. George Ferguson Professorship, and the Canadian Lung Association recently published a "Canadian Tuberculosis Statistics Guide" (Brian Graham, Executive Director Sask. Lung Association pers. com. June 8, 1988).

⁹ Jean Graham retired in 1987 (Brian L. Graham, Executive Director Sask. Lung Association, pers. comm. June 8, 1988).

6.4 Discussion

This chapter has described the roles of the various agencies that were involved in providing tuberculosis services to the Indians of Saskatchewan. These included the federal government's Indian and health departments which provided the funding for most of the tuberculosis surveys and studies, and development comprehensive programs following the second world war; voluntary agencies such as the Canadian Tuberculosis Association which was active in educating the public and the government about the tuberculosis problem, in lobbying the government for policy changes, in pursuing government funds, and in Indian tuberculosis surveys; and most importantly the Saskatchewan Anti-Tuberculosis League, which carried out the day-to-day preventive and treatment work in Saskatchewan.

In his analysis of the impact of medical care on the health status of the Indians in the Sioux-Lookout Zone in northern Ontario, Young (1988:123-125) identified several historical periods within which he relates health status and health services. In his study population, health status changed throughout four periods beginning with the early contact era in which a relatively healthy, ecologically adapted population relied on indigenous health care systems; through the period of the devastating epidemics in the late 18th and 19th centuries in which care was left in the hands of missionaries and commercial organizations such as the Hudson's Bay Company; through the early reserve years in which tuberculosis was the major health problem, and health services began to develop; to the post-World War II era in which health status began to improve and modern comprehensive health care was introduced.

In assessing the relative impact of these services, Young (1988:125) suggests that the limited relief-type services before World War II had little if any effect on the Indian's health status. The comprehensive services that developed after 1945 likely contributed to improved health status. However, the impact of the health services cannot be

separated from other aspects of Native society which also underwent profound changes after the second world war.

Because responsibility for the Indians lay with the federal government in Canada, a parallel situation in terms of both health status and the development of services occurred throughout the country, with some local variation. In Saskatchewan, prior to World War II, medical services were no more than a skeleton emergency organization (Wherrett 1965:63), characterized by several token attempts to do something for the Indians; the hiring of a few part-time doctors, occasional targeted surveys and mostly health education and the distribution of circulars on health-related issues. Local initiatives of the Saskatchewan Anti-tuberculosis League were heroic, though perpetually hampered by a lack of federal support. The effect that organized services and the implementation of anti-tubercular measures for the Indians could have had on the population was demonstrated in Saskatchewan in the Fort Qu'Appelle Indian Health Unit in the early 1930s.

Despite some increase in federal services during the period 1911-1927, the impact of these measures on the health of the Indians is questionable, mainly because as was suggested earlier they "were carried out without effective direction" (Young 1984:259).

In his examination of the epidemic in Saskatchewan, Dr. Ferguson did not even mention the sporadic, token, relief services to the Indians in his extensive analysis of the factors modifying the epidemic among the Indians.

The commencement of modern health services to the Indians of Canada in 1927 (Graham-Cumming 1967:125) was hampered by the economic conditions through the 1930s and by staff problems through the war years. The real development of medical and public health services to the Indians was invariably postponed until the years following the Second World War.

Young (1988:125) suggests that the improvement in health status during the post-war years can only partly be attributed to health services, as changes in other aspects of Native society such as diet, housing and sanitation also contributed to improved health. In the case of tuberculosis however, as discussed earlier, improved living standards did not prevent infection. It simply gave added protection to the more resistant members of the community, and prevented small infections from developing into disease. Improved standards of living were of little help to the non-resistant or those constantly exposed including the Indians (Ferguson 1938:34).

The important role of population-resistance in the ecology of tuberculosis in the Indian population indicates that the preventive BCG and case-finding programs funded by the federal government and conducted by the Anti-tuberculosis League in Saskatchewan in the 1940s and early 1950s, in a large part, accounted for the dramatic decrease in the tuberculosis death rate in the province. Figure 6.1 illustrated the increasing number of new cases of tuberculosis reported and hospitalizations concomitant with the increasing coordinated services and the declining death rate that occurred through these years. Young (1988:50) concurs in suggesting that tuberculosis is the one disease where, in the short-term, medical care factors seem to have been remarkably successful in decreasing the disease burden. The successes in the Qu'Appelle Indian Health Unit in managing tuberculosis as early as the 1930s also indicates that, prior to the era of anti-microbial treatment, an organized tuberculosis program for the Indians could have had a major impact.

Hodgson (1982:505) addresses the concern of why treatment was not made available to all the Canadian Indians much earlier. She suggests that in addition to economic restraints, the government rejected sanatorium treatment for tuberculous Indians prior to the 1940s on the philosophical grounds that it would not be accepted by the Indians. Several examples from Saskatchewan suggest that in fact many Indians

recognized the value of certain Western treatments and took a very active role in seeing that their health needs were attended to. For example, in 1933, John Albert, an Indian from Sweetgrass reserve, had four children with tuberculosis. When his 16 year old son James died after being diagnosed with tuberculosis but never treated, Mr. Albert became concerned for the lives of his other three children. He appealed to the local Agent but received no reply; the local physician Dr. Norquay felt that Mr. Albert was just raising a fuss. Mr. Albert then wrote to the Indian Department, requesting sanatoria treatment for his children. Assuming a response would not be immediately forthcoming, Mr. Albert appealed to the town council in Cut Knife for assistance. On April 14, 1934 the Secretary-Treasurer of the R.M. of Cut Knife, received a letter from the Indian Department. The letter appears to be giving John's request the "run-around". Ironically, on the same day this letter was received one of John's sons was admitted to Prince Albert Sanatorium, and later a second was sent to Fort San (PAC RG10, Vol.1015 p.211-215).

In treating the Indians in northern Saskatchewan, Dr. P.E. Lavoie stated that when he arrived in Ile a la Crosse in 1936, the hospital, which had been built by the Indian Department but not maintained, was in ruins, and the Indians were indifferent and even hostile. Once they got to know him, however, he suggested that "they were always willing to accept treatment, even surgical ones, no fuss, no recriminations, no hysteria, but a stoic behaviour in pain and adversity" (Saskatchewan Archives, Papers of Dr. P.E. Lavoie, File 19). In addition to archival sources, Indian Department annual reports also record "demands" on the part of the Indians for treatment. For example, in 1929, strong appeals for help were registered from almost every reserve (Canada. Dept. of Indian Affairs Annual Report 1929:9-10).

Hodgson (1982:509) suggests that, despite the successes of sanatorium treatment in reducing the burden of tuberculosis in the Indians from a biomedical perspective, the perspective of the Natives involved need also be considered in evaluating the success of

the programs. Sanatorium treatment was imposed on the Indians and Inuit in the late 1940s, for what the government saw as necessary and humanitarian reasons. In 1954, for example, 1.5% of the registered Indian population of Canada was in tuberculosis sanatoria (Hodgson 1982:509). In this enforced hospitalization tubercular Native patients were kept in limbo and had to live in a world in which the language, ethos, food and lifestyle were foreign to them. Focusing on her knowledge of the Eskimo, Hodgson (1982:508-509) suggests that the effects of this experience (such as a fear of hospitalization) and the disruption of family and community life, cannot be gauged.

The following chapter examines several case histories of Saskatchewan Indians who were in tuberculosis sanatoria in order to explore the individual's perception of tuberculosis and of the sanatorium experience. Additional questions address the impact that these experiences may have had on their lives since the time of their illness.

7. SOME INDIAN PATIENT PERSPECTIVES

7.1 Prologue

The history of tuberculosis among the Indians of Saskatchewan has so far been written from a medical ecological perspective. Most of the historical and archival sources which were used in the analysis of health services to the Indians are government documents which inevitably have a bias towards the government perspective. In order to elicit an additional perspective, this chapter presents a series of case studies of Saskatchewan Indians who were hospitalized for tuberculosis treatment. These case studies represent the personal histories of individuals which have been shaped in part by their hospitalization experiences.¹

Organized anti-tuberculosis programs were developed for the Indians of Canada in the years following the Second World War. These initiatives took two directions: active, preventive BCG immunization of the non-infected Indian population, and case-finding, isolation and treatment through hospitalization of tuberculous Indians. In 1944, only .6 beds per death were available to the Indians in Canada (Canada. Dept of National Health and Welfare 1947:55). By 1948, with the new Indian hospital in North Battleford, the Indian hospital at Fort Qu'Appelle, and empty beds in all three provincial sanatoria, accommodation was available for all known Indian tuberculosis cases in Saskatchewan.² These beds were made use of in the intensive case-finding, isolation and

¹ Locker and Kaufert (1988:24) interviewed several people who had polio in the 1950s, people whose personal histories had been shaped in part by medical intervention and technological change.

² Case finding surveys covering all of Northern Saskatchewan did not begin until the late 1940s.

treatment programs of tuberculous Indians for the next two decades.³

Very few Indians in Saskatchewan received sanatorium or hospital treatment for tuberculosis prior to the transfer of Indian health services to the Department of National Health and Welfare in 1945. Hospitalization, as the standard accepted treatment for the Indians, only became possible when government policy changed, and when beds became available through both increased federal funding initiatives and the decreased need for beds in the non-Indian population.

As a result, in the late 1940s, and throughout the decades of the 1950s and 1960s, most active Indian tuberculosis cases diagnosed in Saskatchewan were hospitalized for treatment. Although the exact number hospitalized is not known, 170 beds for tuberculous Indians were available in 1950 in Saskatchewan (Saskatchewan Health Survey Report 1951:115). These beds remained filled to capacity for at least the next 10 years. This indicates that in a population of 16,000 -20,000, a minimum of 1% per year, or 10% of the Indians in Saskatchewan, were hospitalized for tuberculosis throughout just the first decade of treatment (the 1950s). This proportion likely varied immensely in the different geographical regions of the province. For example, for the Qu'Appelle-File Hills area, where tuberculosis had been successfully battled for two decades, the percent hospitalized would have been much lower than for the north where intensive case-finding only began in the late 1940s. Mason (1974) indicates that in Alaska more than 40% of the Natives in one community were hospitalized for tuberculosis over a 20 year period in the 1950s and 1960s.

By the time that hospitalization became the standard treatment for the Indians, tuberculosis was endemic in the Indian population. The death rate had declined to 417

³ Institutionalization was not the only option available. In Africa, for example, after the introduction of effective chemotherapy in the 1950s, the World Health Organization dealt with tuberculosis in the home, using the bulk of their resources to train local health care workers (Hodgson 1982:508).

per 100,000 by 1949, and with the introduction of anti-microbial drug treatment, by 1954 the death rate declined to 69 per 100,000, and to 39 per 100,000 in 1959.

In order to get some idea of the perspective of the hospitalized Indian tuberculosis patient, a series of fourteen interviews were conducted. The focus of the interviews was on the individual patient's perception of tuberculosis and the sanatorium or Indian hospital experiences; with additional questions regarding the effects that these experiences may have had on their lives since the time of their illness. By examining the individual Indian patients' perspective, utilizing these interviews as a probe, the research objective was to assess the individual Indian's perception and experience, and the short and long-term effects of their tuberculosis experiences.

Interviews were conducted in the winter of 1987-1988 and the spring of 1988. All of the individuals interviewed were Registered Indians who were hospitalized for tuberculosis treatment in the late 1940s through the 1960s, and all received drug therapy. All, with the exception of three, were from the southern part of Saskatchewan. Additional information was also obtained from several informants, outside of the formal interview situation.

The patient interviews were arranged through correspondence by mail with the Chiefs of all of the Indian bands in Saskatchewan, explaining the research goals and asking for their assistance in locating former tuberculosis patients who were willing to be interviewed. Nine of the bands (25%) contacted responded either by telephone or through the mail. Several of those who responded recommended further contact with their Community Health Representatives, while others provided the researcher with a list of people who they had approached regarding an interview. On one reserve a woman who worked in the Band office contacted the researcher and three days were spent travelling throughout much the Qu'Appelle Valley, interviewing the people that she had contacted.

Because of the low response rate to the initial correspondence, the interviews do not represent a random sample. The case studies presented therefore, are not necessarily "representative" of the Saskatchewan Indian population.

Of the case studies which are presented, three were men and five were women. At the time of the onset of their illness, most were in their teens or early twenties (one was a boy of seven), and at the time of the interviews most were in their forties and early fifties. While hospitalized all received drug treatment. Their length of stay ranged from eight months to two years, three of the five women were hospitalized more than once.

As stated above, the focus of the interviews was the individual Indian patients' concept regarding tuberculosis and the sanatoria experience, with additional information also being obtained on their life prior to and following hospitalization. Fabrega (1972:206) suggests that analyses of disease should include factors such as the Native perception of the disease experience and individual coping responses. Use of an ecological model allows for the incorporation of this ethnomedical data into the study (Alland 1966:48).

The interview schedule is provided in Appendix D. Although the schedule includes very specific questions, during the process of the interviews it was not strictly adhered to. Generally, the interviews were very open ended, and at their conclusion, the interview schedule was consulted to see that all of the topical areas had been covered. A tape recorder was available, however, it was not used. Several of the first individuals interviewed requested it not be used, and in subsequent interviews it was not asked of them.

A considerable amount of time elapsed between the illness episodes and the interviews, in most cases a minimum of 30 years. This has several implications for the research. Recognizing that the patient's recall of specific events and the details surrounding their illness experiences will be affected by the passage of time, the

interviews attempted to get at broader generalizations, rather than specific details. In addition, using the interview schedule topics as a probe for further elaboration or additional information stimulated remembering in many cases.

Due to the passage of time, the immediate impact of the whole hospitalization experience has been reduced. It was felt, however, that the long-term effects of the experience would still be discernable through a reflective process. Because of this, analysis emphasized their perceptions regarding tuberculosis and the hospitalization experiences and what the individuals perceived as the "effect" of the experience on their lives.

7.2 Case histories

Case 1

The first interview was with Albert,⁴ who was a boy of seven when he was sent to the Prince Albert Sanatorium in the 1950s. The Chief from the reserve where Albert lives asked him to respond to my letter asking for assistance. He made the initial contact and arrangements to meet were made for the following week.

Albert was born in 1949 on a Indian reserve just north of Saskatoon, the second youngest of 12 children. His father farmed on the reserve. At the age of seven Albert went to the Duck Lake Indian residential school (St. Michael's). He received a tuberculin test and an x-ray examination for tuberculosis when he arrived at the school in the fall.

Albert remembered vividly, the afternoon of his sister's birthday in January of 1956, when he and two other kids were "nabbed" from the playroom at the school and taken to the sanatorium at Prince Albert. Albert's mother wasn't told that he was sick and she wasn't aware that he was being taken for treatment.

⁴ Pseudonyms are used throughout this chapter.

At the beginning of the interview, Albert talked about his life before his illness; what he was told about his illness once he got to the sanatorium; and what his explanation or knowledge of tuberculosis was before his hospitalization. He couldn't remember arriving at Prince Albert very well but he doesn't think that his illness and treatment were explained to him. He knows that it wasn't explained to his family. Albert's personal understanding of tuberculosis, which stems from his family's experience with tuberculosis, was that it was related somehow to coldness and wetness. This particular explanation did not suggest that it was transmitted from person to person.

Albert suggested that this family interpretation stems from an incident in which one of his aunts got soaking wet and cold, and shortly afterwards became very sick and died of tuberculosis. At this point in the interview, in retrospect, he recognized some of the earlier symptoms of his illness, feverishness and chills. To Albert, this strengthened what he believed was the illness etiology.

When asked about the relationship between diet and tuberculosis, Albert said that they did not consider diet as an influential factor, and they could not have done much about it if they had; they ate what they could. They just knew it was important to take care of themselves, bundle up and not get cold or wet. Interestingly, early Indian Department annual reports and circulars dating from before 1911 and Colonel Stone's early work on Indian tuberculosis for the department do not recognize tuberculosis as an infectious illness. It is considered to be "in the family" and onset of symptoms were believed to be related to the idea of getting cold and/or wet.

In terms of his families response to his illness, Albert said that his family had a "fear" of tuberculosis, not of the individual who had the illness. The fear he said stemmed from having lost four family members to tuberculosis, three aunts and an uncle on his father's side.

Albert was able to recall life in the sanatorium remarkably well, considering both the time that has since elapsed and how young he was. When he arrived he was put alone in a room where he stayed for the first several months. Later on he shared a room on the men's ward with a boy from Onion Lake reserve who was a few years older than he was. Albert was in the sanatorium from January until August of 1956, throughout which time he received regular injections in the hip. He was tutored by a tall woman who brought him books and helped him to write letters home. He thought that this was funny because he couldn't read the books that he was brought. During his eight month stay at the sanatorium, Albert's parents and his sister were only able to visit him once. Albert fondly remembered a woman patient he met in the sanatorium. She was from Beardy's reserve, and he said she helped to make all of the children's stays there a bit more pleasant. This woman had been in the sanatorium for some time, and was well enough to visit around with other patients. Albert said that she was always trying to cheer all of the kids up. She helped him through a lot of loneliness with her motherly care and visits. Through the years he has kept in contact with her, and he has also tried several times to find his ex-roommate from Onion Lake.

Albert recounted a number of incidents that took place in the sanatorium. He talked about how strict the staff were with the children, and he remembered vividly how regimented the patient's daily routine was. He said that if children got out of bed, or misbehaved, the staff took away their pyjama bottoms, and/or underwear to keep them in bed. He remembers this point well, since more than once he had his underclothes removed!

Albert, did not remember any of the sanatorium staff or the nurses, but he does remember Dr. Kirkby, who seen from a frightened child's eyes, was short, curt, brisk and to the point.

In terms of the day to day routine in the sanatorium, Albert recalled several things. He remembered, somewhat sadly, that the boy in the next bed from Onion Lake never had any visitors, since it was too far for his family to travel. Since this boy had no visitors or contact with his family, when Albert's mother sent a treat she would also send something for his roommate. Albert remembered that he was very unfamiliar with most of the food served in the sanatorium, especially all the vegetables. He remembered that once in a while all of the beds on the men's ward were rolled out into the hall so they could visit. He remembered that he learned a lot about sex from the older male patients during these visits. He also recalls being rolled, in their beds, out into the sunlight in the summer, and that his room faced south, towards the city of Prince Albert. He remembered a lot of Indian kids running away from the sanatorium, and admits that he too spent a lot of his time, since he had so much of it, plotting his escape. He also remembered occasional movie nights, and doing some crafts. When asked about his overall impression of the sanatorium he suggested that it was that it was crowded, and that he could only remember a few non-Indian patients.

When Albert was released in August of 1956 he was instructed to take it easy and make sure he rested every afternoon. He also had to go back for a follow-up examination every six months. For a whole year after his release he stayed home from school, his mother took care of him, and she made sure he rested daily. When he went back to the residential school in Duck Lake in the fall of 1958, a year and a half behind in his studies, he got off the truck with the kids his own age, and went straight into third grade. He said he found that year a little difficult.

In 1959, the kids from his reserve were transferred to a day school in a town much closer to his home. After finishing his grade school there, Albert went on to high school, and following high school, he went to university and received his Bachelors degree. He is currently finishing his Masters degree at the University of Saskatchewan.

His thesis is a study of the reserve he grew up on, and now lives on, with his wife and four children. He works for the Band, at the same town school where he finished his primary education. He is a teacher and guidance counsellor for the Indian students. He also teaches a Native Studies course at the school, and works occasionally for the band as a consultant. In the past he has also worked for another band in the area.⁵

In terms of the influence of the illness experience on his life, Albert indicated that he believed that it was substantial. He said that, as a result of his lengthy hospitalization, and subsequent year of rest at home, his family saw him as the "weak" son. As the sickly child he was perceived by his family as unable to take up his responsibilities on the farm as the other sons had. As a result, he said, he was pegged as the child to get an education.⁶ Because he was unable to do heavy labour and help out on the farm, like all his brothers did, Albert's life took what he indicated was quite a dramatic turn. He said that at that time, not a lot of Indian kids went to highschool, and even fewer went to university. Because he had tuberculosis and was the sickly child his life was much different from the rest of his family, and from other reserve children.

Case 2

The following interview was conducted with Mary on a reserve in south-eastern Saskatchewan. Mary was hospitalized for glandular tuberculosis in October 1955.

Mary grew up on an Indian reserve bordering her present home. She was the oldest of 7 children. Before her illness, she knew about tuberculosis but was not familiar with it; she couldn't remember a lot of people from her reserve having tuberculosis, and she was sure that no one in her family had it. She remembered tuberculin surveys which

⁵ In January of 1990 Albert was elected chief of the reserve he grew up on.

⁶ Few of his brothers and sisters went on to high school after completion of their primary education, though several have in the past few years.

were conducted at her school every fall.⁷

When she was 14, Mary became extremely ill. She mainly remembers an extreme, overwhelming tiredness. Every day when she came home from school she slept, barely having stayed awake in classes. For a long while, at first, her mother took care of her, then one day someone came and picked her up and drove her to the hospital at Fort Qu'Appelle, about an hours ride away. She does not remember if it was a nurse of the local doctor or a family member.

Mary spent the next two years on the tuberculosis ward at the Fort Qu'Appelle Indian hospital. When she arrived at the Indian hospital she said that she was very apprehensive about what was happening to her. She was petrified that it might be tuberculosis, in fact she remembered how scared she was of it: "People had holes in their lungs and sometimes people got their lungs taken out".

Her worst fears were realized. When they explained her illness to her, however, she said that she was just relieved that she did not have a "hole in her lung". They were not able to tell her how long she would have to stay, although she thought it might for just a few days.

In the hospital Mary shared a room with another woman. At the age of fourteen she said was glad that she was not in with young children; the children's ward was a separate wing of the hospital. In discussing life in the hospital she recalled being very well fed, in fact, she laughed when she remembered how much weight she gained. She received a shot every second day in the hip and the leg. She also remembers the windows being open a lot. For the first four months she was on strict bed rest, after which time she was allowed to walk around and visit. She remembers reading a lot, and

⁷ In examining the data on tuberculosis deaths, there were only 4 recorded for the 30 years prior to Mary's hospitalization from her reserve. In addition, the reserve she lived on was in the Fort Qu'Appelle File Hills demonstration unit in which tuberculosis measures had been introduced in 1928.

taking classes, but not all the subjects she needed were taught. Once she began to go on outings and shopping trips to Regina she knew she was almost well. She said that her trips to Regina with hospital employees were an experiment of sorts.

After two years in the hospital Mary didn't want to leave. The hospital had become home. It was comfortable, all of the staff were really nice to her, the patients were very friendly, and she made a lot of good friends. Once she got over her initial fear of tuberculosis she grew to like it there. It was only negative at first, and because she did not know how long she would have to stay. As her reserve was fairly close by, she had a lot of visitors. In the end she did not want to go home where she knew she had no future.

When she returned to the reserve at the age of 16, Mary went back to school to finish her grade 11. She found her last year very hard, but managed to struggle through with the help of a teacher who gave up some of her spare time to tutor Mary.

Following grade 11, Mary moved to Regina, where she worked as a ward aid in Regina General hospital, aspiring to become a nurse. Maybe, she suggested, because of the role models in the Indian hospital, although she said she always liked to help people.

Mary was in Regina for less than six months when she became ill again. This time with rheumatic fever. Reluctantly she had to quit her job at the hospital. She was sick for over a year and never returned to her pursuit of a nursing education. She married when she was 21, raised a large family, and drove school bus on the reserve for 12 years. Today Mary is the NADAC (Native Alcohol and Drug Abuse Commission) counsellor on the reserve where she lives with her husband, who is the band chief. She is also raising two of her grandchildren, after a daughter's death several years ago.

In drawing out her analysis of the entire illness and hospitalization experience Mary suggested that for her the whole experience was just another part of her growing up. She did not think that it represented a period of time which she considered a "chunk

out of her life".

When questioned about why she thought that the experience may not have been that influential in her life, Mary provided an interesting insight. She suggested that the experience was not traumatic for her because of her age when she went to the hospital. She had no kids to leave behind, like women she heard crying in the hospital night after night; she had no one back at home to worry about; she had no career interrupted or no life to put on hold. In fact she suggested that her life on the reserve was a dead end in which she was "going no where" which may have been enhanced because of this interruption.

Case 3

George, a warm friendly middle age man with an impish sparkle in his eye, today farms on reserve land near the Qu'Appelle Valley. George was in the Indian hospital in Fort Qu'Appelle in the early 1950s at the age of 28, for just over a year. When he became ill he was married and he had four boys. He farmed and raised horses and chickens on the same land he is on today.

George "took ill" one day while working on the farm feeding the horses. He fell to the ground very weak. His family found him lying there some time later, unable to move, and they rushed him to the Indian hospital in Fort Qu'Appelle. He was diagnosed with tuberculosis, and the doctor there explained the necessary treatment to him. He was unable to tell him how long he would have to stay. George said that he understood that he had to stay in the hospital if he was to get well, and so that he wouldn't give tuberculosis to anyone else. He knew that tuberculosis was contagious, though he was unfamiliar with the specific term. He was quite concerned about his sons' health.

Irrespective of his concern for his children's health, George admitted that he did think about escaping from the hospital several times. He confessed to plotting his escape

because of the frustration of lying around idle, unable to help, while his young family was struggling to put food on the table. Before the time of social assistance, George's wife looked after the children while he was away, with only the support of his family and the community. Because of the contagious nature of many of the illnesses treated at the Indian hospital, George said that his children weren't allowed to visit him, though his mother and his sister often brought him news of his growing family.

For the first several months in the hospital, George was in a room alone, until he was transferred to the main floor men's wing. He knew a lot of the patients in the hospital, since many were his contemporaries from his own and surrounding reserves. He remembers that they spent most of their time talking and joking, just to pass the time. In terms of treatment, he remembers being on strict bed rest and receiving needles every day. Once he was getting better he was allowed to take walks in the town.

When George was released from the hospital he returned to his reserve, and took up farming again. He was cautioned to take a rest of at least an hour every day, for six weeks. Laughing, he said he had no choice but to follow this advise; he felt too tired most of the time not to rest. He remembered one funny incident that took place shortly after he got home. Apparently he was supposed to return to the Indian Hospital for a six month check-up, but he was busy and he forgot. Much to everyone's amusement the local R.C.M.P. Constable was dispatched to pick him up to take him in to Fort Qu'Appelle. He said his neighbours still laugh about it today.

Once out of the hospital, George took over the care and responsibility of raising four small boys on his own. Years later, he remarried, had four more boys, and his second wife left him. He then raised the second set of four boys on his own. The youngest is now in grade school.⁸

⁸ George's second youngest son died tragically in December of 1987 in a traffic accident in the town of Fort Qu'Appelle, shortly after our interview.

When asked about his thoughts regarding his illness and hospitalization experience, and how it might have influenced his life, George said he couldn't think of anything specific except maybe that he missed his boys a lot while he was away, and that he is very health conscious today. He showed me his cure-all tonic that he buys in Edenwold and gave me the address of the man that he buys it from. Although he perceived little influence, this may reflect the fact that so much time has passed. Being away from and missing his kids for so long, and his wife leaving him as a result of his being away, could be considered somewhat of a major life event. George portrayed a very stoic attitude to all that had happened to him.

Case 4

James is a resident of a reserve in south central Saskatchewan, though today he spends much of his time off the reserve. He was in the sanatorium at Fort Qu'Appelle from 1963 to 1965, when he was a teenager. James said that he was familiar with tuberculosis because he grew up very close to Fort San and the Indian Hospital and because tuberculosis was in his family. His mother had tuberculosis and was previously hospitalized,⁹ and his two year old sister was in the sanatorium at the same time that James was.

In discussing the onset of his illness James said that he was really ill for a long time. Neither he nor the physicians had any idea of what was wrong with him. He spent almost eight months in Regina General Hospital before they diagnosed his tuberculosis. He was then transferred to Fort San.

When he first arrived at Fort San, James remembered that he was on full-bed rest and got needles and pills regularly, as well as "gastric washes". After his term on

⁹ An interview was arranged with James' mother in the spring of 1988, however unforeseen events precluded it taking place.

full bed rest was over, he was able to move around and he said he socialized a lot with other patients and with the staff, several of whom he still runs into and recognizes today.

James related several incidents and stories about life at Fort San. He remembered the strict regimen that children were forced to adhere to and that the nurses usually had a great deal of trouble keeping little children confined to their beds. In order to enforce strict bed rest he remembered that the nurses put the disobedient children in strait jackets. He seemed to recall that this was funny to see the little children in strait jackets, until one day a nurse put his little sister in one. All of a sudden, he said, it was no longer amusing. He recalled getting angry and attacking the nurse.

The interview with James revealed several interesting details, as well as a unique, overall general impression of sanatorium life. Although he related several day to day incidents, what seemed most important about the interview to him was the positive attitude he portrayed about being in Fort San. One thing he adamantly stated over and over again was that it was not a bad place. He repeated several times, to make his point, that at Fort San little children were fed and clothed very well, and given books and good educations. In fact, he pointed out that children in the sanatorium got "new" clothes, something they did not get at home. "If anyone tells you anything bad about the place, it isn't true".

James' short list of bad things about Fort San includes: kids being kept in strait jackets; having to remain immobile on total bed rest; getting needles regularly; and kids being forced to eat green beans.

In lieu of responding to my enquiry about the influence of the experience on his life, he answered by reinforcing his belief of how good it was for children in there, and the positive impact it had on their lives; that it was not a bad place, and not to listen to bad things anyone says about being in the sanatorium.

Case 5

The Community Health Worker at a reserve just north of Saskatoon set up the following interview, which was conducted on the reserve, in the health clinic.

Today Elizabeth lives on a reserve near Duck Lake, with her husband; her children are all grown. Elizabeth was in the sanatorium at Prince Albert three times; in 1945, 1948, and again in 1955,¹⁰ for 15-18 months each time. The first time she was hospitalized in 1945, Elizabeth was 21 and unmarried, and lived with her family on a reserve very close to Prince Albert. Elizabeth knew all about the sanatorium from relatives who had been there; she had a cousin there, and she also had a sister who had tuberculous meningitis. Also, from living so close to the Prince Albert Sanatorium, she knew what went on there and when she herself became ill, she said she wasn't afraid. She recalled few reserve surveys until the 1950s.

When she became ill, Elizabeth was coughing up blood. She said that she immediately recognized this classic symptom as tuberculosis. She went to the doctor who explained the contagious nature of the illness to her, and told her she had to go to the sanatorium. She was aware that she had to go to the sanatorium in order to get better, and she said she wasn't really upset about it; she was concerned and didn't want her family to get ill. When asked how she got to the sanatorium she replied that she walked because it was only 8 miles away.

This first time that Elizabeth was in Prince Albert sanatorium she was there for 18 months, on strict bed rest for the entire time. At this time, in the 1940s, drug treatment for tuberculosis was not yet common in Saskatchewan.

On this first stay at the Prince Albert sanatorium Elizabeth was put in a room with her cousin, whom, she recalled sadly, died shortly after Elizabeth's arrival. In the

¹⁰ In our discussion about her illness and hospitalization, the three sanatorium stays made clarification of details rather confusing.

sanatorium she received an x-ray, and gastric tests, as well as a phrenic nerve operation.

Elizabeth's first relapse occurred 1948 when she was 24. At this time she was married and had a child, who her mother in law took care of while she was away. While in the sanatorium she had a bronchoscopy, and recalls being rolled outside, regardless of the season, to sleep at night. The main treatment was again total bed rest.

By 1955, and her second relapse, Elizabeth had two more children. This third time in she remained in Prince Albert Sanatorium for 15 months and received streptomycin. Following her release she said that she was told she had to take pills for three years.

When questioned about her experience, what she remembered was a combination of all three sanatorium stays. She remembered the meals, and lots of vegetables, especially the fact that the kids did not like them one bit. She remembered a lot of Indians and a lot of kids from the north, and recalls that the Indian patients were not segregated from the white patients. She remembered that in the sanatorium at Prince Albert the lower three floors were occupied by men, and one upper floor by women. The children were kept separate. She remembered seeing a lot of Indian parents from the north camped around the sanatorium trying to get their children back, and several who successfully stole their children away in the night.

Elizabeth was visited regularly in the sanatorium, by family and friends, because her home reserve was so close. She also said that she made a lot of friends in the sanatorium, and has kept in touch with most of them. She remembered seeing a lot of patients in body casts, though she didn't know why they were in casts. She did not think it was such a bad place, although she did remember a lot of people from her childhood who never came home from there.

After being released in 1956 for the final time, Elizabeth returned to her young family on her husband's reserve. Since that time she had been a wife and a mother, her

middle child among eight being born deaf. When asked if she was aware of the relation between streptomycin and deafness and she said no. Her son went to the school for the deaf in Saskatoon in the early 1960s, where he subsequently developed tuberculosis and was hospitalized.

In terms of the effect of her hospitalization experience on her life, Elizabeth said that she thought the biggest impact came from missing her children so much while she was away. She didn't say that she cried herself to sleep at night, but, though she tried not to show it to other patients and the staff, she said that she was sometimes really depressed and was quite unhappy about missing a really important part of the older children growing up. She said things were tough for a while, when she got home, but today she is very proud of how all her kids have turned out.

Case 6

The next woman interviewed was from a reserve near Duck Lake. As she was in Saskatoon on a training course, the interview took place in the city. Anne was one of the last patients in the Saskatoon Sanatorium in the late 1960s, when she was 18.

At the time of our interview Anne was in training to be a reserve health worker. Without prompting, she began the interview, by discussing her conception of tuberculosis. She said that she was very familiar with it. In her father's family there were four brothers and two sisters who had it; most have since died of cancer. Her brother had tuberculosis when he was a baby. She remembers thinking that the sanatorium was a place most people did not come home from, and knowing that it was a place that people went to die. Although she was familiar with the pervasive influence that tuberculosis had in her family, she did not have a clear cut concept of the disease process or its etiology.

When Anne became ill she was coughing up blood and her family took her to a local hospital. Unable to diagnose her illness, at a time when tuberculosis was becoming

much less common in Saskatchewan, she was sent to a larger hospital in Saskatoon. She said she was really worried because no one knew what was wrong with her. Once in the city hospital, two doctors from the sanatorium were sent for. They examined her and told her she had tuberculosis. She remembered that they explained the disease to her, and then they took her to the Saskatoon sanatorium where they told her she would have to stay for up to a year.

None of her fears were alleviated by knowing more about tuberculosis. She hated it in the sanatorium, and she ran away time after time, sometimes to friends' homes in the city, but usually back to the reserve. On more than one occasion her family had to borrow a car or money for the bus to send Anne back to the sanatorium again. For the last three months of her hospitalization Anne was transferred to Fort San. She thought that maybe they did this to keep her from running.

Anne said that the Saskatoon sanatorium was an awful place that she loathes to this day. She also said that she felt uncomfortable there as most of the patients were not familiar to her; they were mostly immigrants who all spoke foreign languages. When asked about sanatorium life when she was not running off, she said she talked with other patients a lot, recalling that most of the Indian patients were "Chips" from the north. She didn't remember seeing many children there. Her treatment consisted of lots of rest, one hour a day of activity, and pills. She remembered that she got really ill when given streptomycin, but no one listened to her complaints since she had a reputation as a trouble maker. She was eventually found to be allergic to it.

Once transferred to Fort San she said that she calmed down and she found that she actually like it there; though she's not sure why, maybe, she suggested, it was the setting. Her parents and her husband visited her at Fort San. While there she thought that she was pregnant, but again she said the staff thought she was "crying wolf" and no one believed her until she began to show. At seven months she was advised to

discontinue the pregnancy because they told her that the child was deformed. After several agonizing days of consultation with her husband and her parents she decided to follow the doctors advice and discontinue the pregnancy.

Following her release from Fort San, Anne went to university in Saskatoon, graduating with a Bachelors degree in education. She taught Cree at Duck Lake School for several years. In 1976 she was diagnosed as having Lupus. In 1985 she began her training to be a Community Health Representative on the reserve where she and her husband live today; she is just completing her training at this time.

When questioned about the effect of the entire experience on her life, she repeated how much she hated it in the Saskatoon sanatorium. You could almost see the anger dripping off each word every time she spoke about her time in the Saskatoon sanatorium. Her hospitalization was an extremely traumatic event that she swears she will never forget.

Case 7

Margaret, a young grandmother who works as a supervisor at the residential school on her reserve in central Saskatchewan, was interviewed in the summer of 1988. Margaret was hospitalized for glandular tuberculosis twice. The first time she was 14, and was a student at the residential school. The second time she was hospitalized she was 16, just married, and finishing high school.

Margaret knew about tuberculosis. Where she grew up so many people from her reserve and surrounding reserves had tuberculosis that she said it was almost "natural", one was expected to get tuberculosis. When she became ill she knew it was tuberculosis. She had huge swollen glands and she was extremely tired. Her mother took her to the doctor, who had her sent to the Indian hospital at Fort Qu'Appelle. She stayed there for six months, on strict bed rest, and under the "lamps" (one treatment for

glandular tuberculosis). After six months at Fort San she said she was suddenly discharged, and her father came to take her home. Fortunate for them a nurse from the hospital was going by their reserve and they caught a ride with her. Margaret pointed out that their farm was two and a half miles off the grid road, and they walked this distance, her father being kind enough to stop several times so that she could rest.¹¹

At the age of 16 Margaret had to return to the Indian hospital. When asked how she knew she had to go back, she said that she knew that she always had tuberculous glands, it was just when they broke open that she had to return for treatment.

This second sudden interruption to her life left Margaret very discouraged. She was disappointed that she had to go to the hospital, but mainly she was upset that she had to abandon her studies again.

When asked about life in the hospital Margaret gave an example of a day's agenda. She said that after breakfast, from ten to noon, the patients rested. After lunch, from one to three p.m., they rested again. For those who were allowed, activities period was from three to four in the afternoon. Supper was served between four and six, then another rest period followed till seven. Bedtime was at nine. During the activities period Margaret said that they did crafts; she did no school work. Margaret remembered that there were a lot of children in the hospital and she said that she knew a lot of the women patients. She listed five other women from her reserve who were in at the same time she was. She said that they spent most of their time talking.

In terms of treatment, the first time that Margaret was in the hospital she was on strict bed rest and under the lamps. The second time, she received shots every second day, and took pills. As well, she said that her painful, inflamed glands were drained. Other patients she noted were in body casts, she thought to keep them from moving

¹¹ One this particular reserve today, all of the homes are within a few hundred feet of the main grid road that runs through the reserve.

around. She also observed that a lot of Indian tuberculosis patients had allergic reactions to streptomycin, breaking out in rashes. She said that the nurses were really good; strict, but you knew that they cared.

Margaret related some interesting patient lore. For example, it was common knowledge among the patients that "the cavity heals easier than the cloud". She said that they all knew how sick the other patients were, and it was really sad because they also knew which patients were going to die. The patients with lung cavities had a much better survival chance than those with x-rays showing a cloud.

Margaret also remembered that a lot of the really sick Indians kept running away, and were either returned by force, or on their own because they were haemorrhaging and on the verge of death.

When questioned about her impression of the effect of her hospitalization experience, she said that for her it was a continuation of the "prison" experience she was accustomed to from years of strict, regimented residential school life. The only difference between residential school and being in the hospital, that she could perceive, was no classes. Because so many people from her reserve had tuberculosis, she said that having the illness was not terribly traumatic, though she stressed that she was very frustrated when she found she had to interrupt her studies and return to the hospital a second time.

Case 8

The second interview conducted in the summer of 1988 was with Phyllis, the Community Health Representative from a reserve in south central Saskatchewan. Phyllis was in the Indian hospital in Fort Qu'Appelle three times in the late 1940s and early 1950s. Her mother died of tuberculosis when she was two years old and she was raised by her grandfathers. Phyllis was aware that she had tuberculosis of the glands from when she was very young. She was hospitalized for the first time in the late 1940s when she

was 12. Her second hospitalization was at age 16, and the third only two months after her release when she was 17. Altogether Phyllis spent over 30 months in the hospital, each time for about 10 months.

In discussing life in the hospital, Phyllis recalled that the first time she was in she had huge swollen glands in her neck and her treatment consisted of strict bed rest, and 15 to 20 minutes under the lamps every day. Her second stay introduced her to streptomycin. She said that she broke out in a fine rash all over her body, and they said she was allergic to it. Following this she was put on pills - PAS/INH.

When she first arrived at the hospital Phyllis said that she was extremely tired, in fact she recalls sleeping for most of the first month there. Like Margaret, when she was a teenager, Phyllis said that she was quite disappointed that she had to go to the hospital, and leave her school work. She remembered that she did take some classes in the hospital, though they didn't offer all of the courses that she needed. She said that she learned how to do beadwork and to knit while there.

Phyllis outlined how the tuberculosis treatment regimen in the hospital worked. She said that when you arrived you progressed through six scheduled "routines" leading eventually to your release. Routine One, that to which every patient yielded on arrival, consisted of strict (complete) bed rest. This meant that you did not get out of your bed for any reason, at all, ever. On this routine patients had to use bedpans, and were sponge bathed. This routine lasted anywhere from three to six months.

Routine Two, following the initial phase of complete bed rest meant that a patient was allowed out of bed "on occasion". Patients were allowed to use the washrooms but under no circumstances were they allowed to take a bath. Bathing in a tub was the privilege of Routine Three. On Routine Number Four a patient was allowed to walk around the hospital during the designated activity hours. It was not until Routine Five that a patient was able to spend most of their time out of bed. Routine Six, and being

allowed to walk around outside, indicated that a patient was almost well. Each of these routines lasted a varying period of time, depending on a patient's adherence to them, and of course the progress of their illness. Patients who ran away from the hospital had to begin their treatment over again from Routine One when they were returned.

In our discussion of life at the hospital Phyllis recalled many of the people she encountered daily at the Fort Qu'Appelle Indian hospital. She knew many of the Indian patients from the Qu'Appelle area, and she got to know a lot of Indians from all over the province, especially from the north. She thought that most of the tuberculosis patients were women, and she remembered many young mothers softly crying themselves to sleep at night. Her heart went out to these women, but there was nothing that she could do for them. She remembered a petit English woman who was a nurse at the hospital, Mrs. Mary Thomas. Phyllis said that Mrs. Thomas was strict, but she was very kind and good at what she did.

Phyllis remembered distinctly the Indians who ran away from the hospital, who returned, on verge of death, haemorrhaging blood, and having to begin their treatment all over again at routine One. She also remembered the doctor in charge of the Indian hospital at the time, Dr. Porth, and she remembered what he told her when she expressed her disappointment at being ill. Dr. Porth told her that after she had a family, things would change for her, and she would never have to come back to the hospital; providing, for her anyhow, that needed light at the end of a long dark tunnel.

After Phyllis was released she worked in the Indian hospital, though not on the tuberculosis floor, for three years, from 1959 to 1962. She quit working after she started having a family. Throughout the years of raising a family, Phyllis continued her education, taking several university classes as well as becoming certified as a Nursing Assistant. Today she is the Community Health Representative on her home reserve, a position she has held for more than 15 years. She is very active in her community, is on

numerous committees, and is proud to call herself one of a group of people who "care". Today she said that she is still extremely cautious about her health. She knows that she can't let herself get run down or tired, she is very diet and health conscious.

When asked about what she perceived the effect of her illness experience was Phyllis indicated that she did not see tuberculosis as something that was that alarming; it was very common in fact rather incipient; always there, and not the cause of much concern. She was disappointed about her studies being interrupted when she had to return for treatment. It certainly has made her more diet conscious and aware of her own health.

Case 9

Although not a tuberculosis patient herself, Violet grew up surrounded by tuberculosis in her family and her community. Raised on a reserve adjacent to the Qu'Appelle valley, when Violet was a teenager she married a man from a neighbouring reserve. Her husband had tuberculosis as a boy in the 1930s. He recently died of lung cancer. In the early 1950s Violet's 18 year old daughter was hospitalized with glandular tuberculosis, received 15 months of treatment and was released. She was working as a nanny when she suddenly died a short time later from miliary tuberculosis. Violet said that miliary tuberculosis was the worst kind, because it was so quick to consume, hence the name, galloping consumption.

Violet's brother had tuberculosis and had lung surgery in the early 1950s in Saskatoon, and her brother in law had glandular tuberculosis, also in the early 1950s. After her last child was born, Violet, was x-rayed and a spot was seen on her lung. She was sent to Fort San, had a gastric washing and another x-ray, and was released after three days.

Violet said that following her husband's treatment for tuberculosis in the sanatorium, he was treated by a local woman with traditional herbs, as a preventative measure. Violet attests to the efficacy of this treatment, his tuberculosis did not return.

Today Violet lives alone in the shadow of the Qu'Appelle. She is a member of the Band Council. She proved to be a very insightful informant. She took me around the reserve, through the Qu'Appelle Valley, interviewing people she knew who had tuberculosis, and she told me the story of her family's tuberculosis experience. She also suggested that I return so we could go to other reserves, where she knew many more people who had been in Fort San and the Indian hospital for tuberculosis. In the course of our day together, and subsequent contacts I was astonished by what strong a person Violet was. In the face of unsurmountable odds by any standards, in a family racked by illness and disaster, she survived. Today when she reminisces she says "I got by O.K.". She epitomized a stoic attitude; we work, we get sick, we get better, and then we go on with our lives. Life has been an uphill struggle for her all the way, but she doesn't seem bitter, or angry, she says she just works at it a little harder now.

When I returned to Violet's reserve in the summer of 1988, we spent two additional days together. She took me to a reserve about an hour away, where she had several relatives. I had also previously contacted the Chief of this reserve, and had with us a list of ex-tuberculosis patients who he had previously indicated were willing to be interviewed. When we arrived at the band office to see the Chief, Violet was really apprehensive about going in. When I asked her why, she said that she was scared of these Indians. We laughed about it. Anyhow, she came in, we spoke with the Chief and he directed us to the location of two women we could interview immediately.

Upon returning to the same reserve the following day, Violet had contacted an old friend, whose husband had tuberculosis as a young man and had been sent to a sanatorium in Manitoba. Violet's friend had prepared lunch for our timely arrival right

at noon. We spent two hours talking over lunch. We talked about everything from illness, to religion, to Saskatoon berry picking. Just as we were leaving to look for Violet's cousin, who coincidentally was at the same time looking for us, she arrived at the home we were visiting. The people at the band office had told her we were looking for her and would be back, and she was looking forward to taking us around to visit several of the elders on the reserve. Unfortunately, it was Pension cheque day, and most of the people on my interview list were in town shopping. Instead of going around the reserve visiting, I interviewed Phyllis that afternoon, who had herself been in the Indian hospital for tuberculosis. I arranged to return the following week to go around with Phyllis to interview the elders, but a tragic death in her family put a stop to our plans.¹²

7.3 Discussion

The case histories, in addition to other interview information, provide several interesting insights into tuberculosis from the individual patients' perspective. The interviews also highlight several recurring themes about the tuberculosis and sanatorium experience for these Indian patients. Some indication emerges regarding the effect that this experience had on the lives of the individuals once released from hospital.

With regard to their perspective on tuberculosis, two dichotomous views emerged from the interviews. Several of the people interviewed expressed a fear of tuberculosis because of their familiarity with it; growing up and living surrounded by tuberculosis in their families and on their reserves. Anne feared tuberculosis and the sanatorium because six people in her family had died of tuberculosis, and because she had heard stories of people who never came home from the sanatorium; she knew that people went there to die. Other individuals interviewed also had seen and heard stories of family and

¹² Had it been possible to conduct interviews with these elders, an additional perspective may have been obtained. Many of them had survived tuberculosis in the 1930s, and had been hospitalized before drug therapy.

friends dying from tuberculosis or being taken off for treatment, and never returning. Albert said that his family feared tuberculosis because of their history with it, four deaths on his fathers side of the family. Albert was the only individual that explicitly said that his family 'feared' tuberculosis, not the individual who had the disease. The openness of most of the individuals who were interviewed in discussing their tuberculosis experiences suggests that there was not a stigma attached to having the disease.

One of the women interviewed knew about tuberculosis and feared it, but was not familiar with it. She said that this was because there was no tuberculosis on her reserve that she could remember, and she knew that there was none in her family. Mary's perspective is unique. To discover why she would not be familiar with the disease, as all of the others were, the data on tuberculosis deaths from the Saskatchewan Anti-Tuberculosis League case-registry was re-examined. These data indicated that there were only four deaths recorded from Mary's reserve for the 30 year period prior to her hospitalization. Further examination of the historical data revealed that the reserve Mary lived on was in the Fort Qu'Appelle-File Hills demonstration unit, the unit in which anti-tuberculosis measures had been introduced for the Indian population in 1928. Her lack of familiarity with tuberculosis appears to both reflect and reinforce the success of the demonstration unit in implementing anti-tuberculosis measures among the Indians.

In contrast to the individuals who feared tuberculosis because of their familiarity with it, most of the people interviewed were very familiar with tuberculosis, but they did not fear it. All of these individuals, except for Elizabeth, were from reserves in southern Saskatchewan. Elizabeth said that she was familiar with tuberculosis because many people from her reserve had been ill, and because her home reserve was so close to the sanatorium at Prince Albert. The people interviewed from southern Saskatchewan also lived in fairly close proximity to either a sanatorium or an Indian hospital.

Margaret said that she was familiar with tuberculosis because on her reserve it was so common, it was incipient, everyone got it. James, who was from the same reserve as Margaret, was familiar with tuberculosis because he had a sister who had tuberculosis and his mother had also been in Fort San. Phyllis's mother had died from tuberculosis when she was a child, and she was aware that she also had it from when she was very young. Several individuals in Violets family, her husband, daughter, brother and brother-in-law, had tuberculosis, and to her it was not alarming.

This general familiarity with tuberculosis suggests that all of those interviewed were aware of the social context of tuberculosis in their families and communities. In terms of what the individuals interviewed knew about tuberculosis from a biomedical perspective, most had some idea of its symptomology, though its specific etiology was not known. Mary had heard that people who had tuberculosis had holes in their lungs, and Elizabeth recognized the classic symptom of pulmonary tuberculosis, coughing up blood. Both Margaret and Phyllis knew that their swollen glands were tuberculous, and Margaret knew from patient lore that the patients with lung cavities (pulmonary tuberculosis) had a much better survival chance than those with x-rays showing a cloud (miliary tuberculosis).

Most of the people interviewed, in the initial analysis, also appeared to understand the infectious nature of tuberculosis by expressing their concern about their children or their families. They did not however, use the term infectious or contagious, and in general, they were not aware of the specific nature of the disease transmission. Their concern for their families appeared to stem from observations that tuberculosis was "in" particular families, not necessarily because they thought they could "give" tuberculosis to them. Albert, Phyllis, and James were familiar with tuberculosis because of their family's history with it, and Albert knew it was related to getting cold and/or wet. When George said that his kids couldn't visit him in the Indian hospital because of the infectious nature

of the illnesses treated there, he was not referring to his own illness. This family concern again indicates a broad knowledge of the social context of tuberculosis, not a specific knowledge of the disease process from a biomedical perspective.

In terms of a perspective on the treatment of tuberculosis, most of the individuals interviewed appeared to be aware that hospital treatment was necessary, if not for their own health, so that the significant others in their lives did not get the disease. Archival sources and government annual reports indicate that many Indians recognized the value of certain Western medical treatments and took an active role in seeing that their health needs were attended to. Dr. P.E. Lavoie, the physician at Ile a la Crosse for over thirty years, suggested that "they were always willing to accept treatment, even surgical ones, no fuss, no recriminations, no hysteria, but a stoic behaviour in pain and adversity" (Saskatchewan Archives, Papers of Dr. P.E. Lavoie, File 19). Indian Department annual reports record several demands on the part of the Indians for treatment (Canada. Dept. of Indian Affairs, Annual Report 1929:9-10).

All of the individuals interviewed indicated that they were aware of the necessity of hospital treatment. Noone indicated that they refused to go to the sanatorium, except for Ann who ran away several times. Most, however, plotted their escape time after time. This suggests that perhaps their stay in the sanatorium and hospital was not of their own volition. The interview schedule that was used did not include specific reference to whether an individuals' hospitalization was voluntary. Interview data, however, suggests that in several cases it was out of the individual's hands. For example, Albert was whisked from the playroom at school, and Ann was "taken" from the hospital in Saskatoon to the sanatorium.

In the interviews, based on several archival references, it was assumed that the Indians wanted treatment, and once treatment was available to them, they embraced it with open arms. This appeared to be true in many cases. However, several statements

made in the interviews suggested that many Indians went to the sanatorium or Indian hospital because they were forced to, or would be forced to if they didn't go willingly.¹³

For example, several individuals remembered seeing parents who came to the sanatorium and stole their children away in the night.¹⁴ Others talked about the Indians who kept running away, and who, on the verge of death, were brought back to the hospital. Ann ran away from the Saskatoon sanatorium several times. George, Elizabeth, Phyllis, and Margaret all indicated that they went to the sanatorium because they knew they had to. It was assumed in the interviews that they knew they had to go for their health; to get better. However, they may have known they "had to" go to the sanatorium because it was the law.

The information from the interviews about life in the sanatoria or Indian hospital revolved around several themes. The most common and recurring theme that emerged was regarding the patients' observations about the structured, regimented nature of the treatment. All of the people interviewed were on strict bed rest when they first arrived for treatment, and many said that they remained on strict bed rest through their entire stay. Several of those interviewed remembered quite vividly seeing other patients confined in strait-jackets and body casts. Albert distinctly remembered how strict the staff was with children and how the staff took away the kids' pyjama bottoms or underclothes to keep them in their beds. James also recalled how strict the nurses were, especially with the little children. Both Margaret and Phyllis outlined for me the daily and long term "regimen" of tuberculosis treatment with surprising clarity. In addition,

¹³ In 1946 the Saskatchewan Public Health Act was amended, so that a tuberculous individuals who refused treatment could be detained against their will.

¹⁴ Olga Buhler, who was employed as a ward aid at the Prince Albert sanatorium in the early 1950s indicated that most of the employees dreaded working the night shift on the children's ward, for fear that they would have to confront an angry parent.

Margaret, Phyllis, and James all said that although the staff were strict, but you knew that they cared.

Other observations about life in the sanatorium or Indian hospital came from several individuals. Three of the women who were interviewed noted that a lot of Indian patients in the hospital appeared to have allergies to the anti-tuberculosis drugs that they were given. Ann and Phyllis were themselves allergic, and Margaret said that she noticed a lot of Indians with fine rashes on their bodies. Several individuals interviewed indicated that they or others in the sanatorium were unfamiliar with food, especially all the vegetables.

For several of the patients interviewed a stay at the sanatorium or Indian hospital was not a bad experience. James pointed out that because of the poor living conditions on many Indian reserves, a trip to the sanatorium or Indian hospital was for some a relief. James said that Indian children were given "new" clothes, toys, and books, and in many cases an education; things they did not get at home. Mary indicated that when the time came for her release she did not want to go back to the reserve. Another woman with whom I spoke, a Community Health Representative from a reserve in north-eastern Saskatchewan, was in Fort San in the 1960s. She said that she chose to remain in the sanatorium after her treatment regimen ended so that she could complete her education, something she could not do back at home in the north.

Several of the people interviewed observed that there were lots of Indians in the sanatorium and that it was crowded. Both Elizabeth, who was in Prince Albert sanatorium in the 1940s and 1950s, and Ann, who was in the Saskatoon sanatorium and at Fort San in the 1960s, noted that there were lots of Indian people in from the north. Elizabeth commented on all of the children from the north, and Ann said all of the Indians were Chipewyan, and she didn't understand their language.

While they were hospitalized, almost all of those interviewed knew several other people who were in at the same time; people who were their contemporaries from their own or surrounding reserves. In addition, all of those interviewed, except Albert, were visited frequently by their families and friends. Both George and Phyllis indicated that they knew many of the other patients, and received regular visitors, and that this made the time there more bearable. Margaret listed five other women from her reserve who were in at the same time she was. In addition, all of the individuals interviewed indicated that they made several lasting friendships with people whom they met while in the sanatorium. Although Albert said that his family was only able to visit him once while he was in the sanatorium, he made several friends while there. The visitors, the contemporaries in the hospital, and the lasting friendships made with other patients, all indicate that the Indian people interviewed who were hospitalized after 1945, were not "isolated" from their families and friends for the duration of their treatment. This is significant. The hospitalization experience, for those interviewed, was not necessarily a bad experience or a traumatic disassociation from their culture. They knew many people in the hospital and made many new friends. In fact, throughout the 1950s, most of the patients in the three sanatoria were Indians.

The effects of the hospitalization experiences once released on the lives of those interviewed appears to be minimal. Some individuals said that the experience had a tremendous effect on their lives, while others indicated that they could see no effect at all.

Following their release from the hospital, several of those interviewed indicated that were unable to resume their normal activities for quite some time. Albert said that he was told to stay out of school for an additional year after his release, and rest every afternoon. This put him a year and a half behind in his school work. George resumed his farming following his release, however, he said that he was often extremely weak and

tired and had to rest every day. Three of the women who were released became sick again with tuberculosis, and were readmitted. Mary got rheumatic fever less than a year and a half following her release, and Ann was diagnosed with lupus about six years following her release.

Most of the individuals were school-age while in the sanatorium. Although some school work was available in the sanatorium and at the Indian hospital, when they get out they were behind in their education, and they all said they found it very tough to get back into it. They did not all indicate that they did complete their highschool, however several of the individuals interviewed have university degrees.

Because Ann became pregnant while she had tuberculosis and was in Fort San, the doctors recommended that she discontinue the pregnancy, and had a tubal ligation at the same time. As a result Ann had a much smaller family than most of her contemporaries, possibly making it much easier for her to pursue a university education.

The disruption of family life which Hodgson (1982) suggested would result from a parent being away in the sanatorium for an extended period of time, was apparent in the case of only two of the individuals interviewed, Elizabeth and George. When George was in the Indian hospital his boys couldn't visit and when he came home his wife had left, and he raised his three boys on his own. Elizabeth said that she missed her kids a lot while she was away, and she missed an important part of her older kids growing up. She also suggested that there were problems once she returned home, though everyone turned out alright in the end. Elizabeth and George were the only two individuals interviewed who were adults with families at the time of their hospitalization. The disruption caused in both of these cases suggests that further research may find this disruption very widespread.

The remainder of the individuals interviewed were children themselves when they were hospitalized. Mary suggested, when asked why the experience may not have

been that influential in her life, that it was not traumatic for her because she had no kids to leave behind, no one back home to worry about, no career interrupted, and no life to put on hold. For Margaret the hospitalization experience was not that much of a disruption, because for her it was just a continuation of the prison experience she was accustomed to from years of regimented residential school life.

In terms of the foreign ethos and language of sanatorium culture that Hodgson (1982) suggests must have had a substantial impact on the experience of the Inuit evacuated for treatment, for these individuals interviewed this was not the case. Most of the people interviewed were from south-central Saskatchewan and evacuation did not take them far from home into a foreign culture. In addition, all of the individuals who were interviewed spoke English. Some indicated that the food in the sanatorium was foreign to them. The number of Indians who were in the sanatorium at the same time suggests that the culture may not have been that foreign to them either.

The long term effects of the hospitalization experience, for those interviewed, were not as apparent as expected. Most of the people interviewed felt that the experience did not have a major impact on the future direction that their lives took. Several individuals indicated that today they are extremely health conscious. George suggested that this likely in part a result of a major illness experience, and Phyllis indicated that ever since her illness she has had to be extremely careful and watch her diet.

In one case the individual interviewed suggested that the experience was extremely influential in determining the direction his future took. Albert, the young boy who spent the first two years when he should have been in school, in the sanatorium and at home resting, was pegged by his family as the sickly child. As a result his family felt that he would be unable to help out around the farm and they decided that he was the one to receive the education. If Albert had been strong and healthy, like his brothers, he

probably would have begun to work on the family farm after receiving his grade 8, and likely would not have gone to highschool or university.

Information from several of the interviews indicated that for many Indian patients the sanatorium or Indian hospital stay was a positive experience. Kids were fed, clothed, and educated. Mary suggested that the role model of the Indian Hospital nurses may have influenced her decision to become a nurse. However, she pointed out she always wanted to do something that would help people. James seems to have a very positive attitude to the whole experience. It was an adventure for him. He recognized the benefits of being cared for in the sanatorium, such as good food, education and new clothes. Mary also pointed out that she liked it in the hospital. She did not want to return to the reserve, where she had no future. Her sanatorium experience showed her how the other half lived, something she had suspected. As a result she aspired to, and knew she could, do better for herself.

7.4 Conclusions

Using the interviews as a probe, this chapter delineated some of the components of the individual Indian's perspectives on tuberculosis and the hospitalization experience. Because the interviews were not randomly sampled and are not necessarily representative of Saskatchewan Indian culture, broader generalizations about the experience cannot be made from these data. However, information obtained from individual interviews appear to overlap in many instances, suggesting that further research may substantiate these findings. The concept that sanatorium culture itself must have changed substantially after 1945 and the large numbers of Indian admissions, and the Indian definition of tuberculosis from an illness or social, rather than a biomedical perspective, need to be explored further.

Several interrelated factors likely account for the results that were obtained. Most importantly would be the time since the event, 30 years or more in most cases, making recall difficult. Naturally, the number of interviews conducted has influenced the results. However, additional emphasis on the interview phase was deemed beyond the scope of this research, as the main goals were to delineate the epidemiology of tuberculosis in this population, and to determine the effect of health services on the health of the population. The interviews were intended to be a probe, to get some idea of the individual Indian's perspective, and the open interview style contributed to achieving these results.

Why the experience was not portrayed as negative by many of those interviewed may be due to several factors. It was not government policy until the late 1940s to treat Indian for tuberculosis in sanatoria. When this service was made available to the Indians, it was for some a relief to be treated at all. For many the boarding school to hospital transition made the event and the stay less significant. The sanatoria sub-culture which was not the same as non-Indian culture and not typical of dominant society must have been substantially influenced by the large numbers of Indians hospitalized, contributing to making the experience less foreign to the Indian patients. The presence of an extensive social network appeared to help the hospitalized individuals to "cope" with what was potentially a negative experience. Finally, the time that has elapsed since hospitalization, may account for some selective remembering of the more positive aspects of the experience.

In terms of possible biases, interviewer bias, in defining tuberculosis biomedically, likely interfered with the results obtained from the interviews in that the whole ethnomedical concept of the "illness experience" was not explored. Some data on this experience came out regardless. A geographical bias, in that those interviewed were all from the south and central Saskatchewan, meant that their experiences were more alike,

but definitely not representative of those who would have been evacuated from the far north for treatment. In addition several of the people interviewed were well educated professionals not representative of the whole Indian population of the province.

In that the interviews were meant to "probe" for an emic perspective, they were successful. Had interviews also been conducted with reserve elders who were ill with tuberculosis prior to the sanatorium era, an additional perspective would have been attained. It was hoped, however, that probing individual experiences would indicate some areas in which tuberculosis may have had a broader impact on Saskatchewan Indian culture. Although examination of this relationship was beyond the scope of the present research in the concluding chapter which follows, several areas for future research on the relationship between disease and culture are discussed.

declined to 69 per 100,000, and to 39 per 100,000 in 1959.

Tuberculosis was no longer the leading cause of death in the Saskatchewan Indian population in 1951. In 1956, tuberculosis was the seventh leading cause of death behind acute respiratory infections; accidents; diseases of infancy; chronic heart disease; senility and ill defined causes; and neoplasms.

In examining the epidemiology of tuberculosis in various geographical regions of the province, the data indicate that epidemic tuberculosis in Saskatchewan reached different groups at different times. In the more remote Pas/Carlton agencies, the tuberculosis death rate remained almost double the provincial Indian average rate, at 1500 per 100,000 into the early 1940s, as it did in Duck Lake agency. In those agencies accessible to the Fort Qu'Appelle Indian Health Unit and hospital, established in 1928, the mortality rates were far below the provincial average as early as 1930. This suggests two things: the later tubercularization of more northern and/or remote Indian groups and their resultant lack of immunity, and the effectiveness of anti-tuberculosis preventive and treatment measures once they were made available in the southern agencies.

By the early 1960s tuberculosis mortality was successfully controlled and the mortality rate was no longer a reliable indicator of the amount of tuberculosis in this population. Morbidity, the traditional measure of illness in a population, was utilized to assess the extent of the continued problem. In 1964, when the mortality rate in the Indians population was just over 24 per 100,000, in the non-Indian population in Saskatchewan it was 1.64 per 100,000, a rate 15 times higher among the Indians (Saskatchewan Anti-Tuberculosis League Annual Report 1965). Morbidity rates in this same year were 199 per 100,000 for the Indians and 17 per 100,000 for the non-Indians, a rate 12 times higher among the Indians. In the 1980s, tuberculosis in the Indian population continued to be a problem, the incidence of tuberculosis in 1984 was 21 times greater than the corresponding rate in the non-Indian population in Saskatchewan.

By using an ecological model to examine tuberculosis in the Saskatchewan Indian population, various environmental and cultural factors that contributed to the Indian population's predisposition to tuberculosis and to their extremely high infectivity and mortality were delineated. These factors may also account for the varying experiences with regard to tuberculosis in different Indian populations within the province of Saskatchewan. Most important was the absence of population immunity. Additional factors included: the concentration of the population on reserves; the occurrence of intercurrent epidemics; sudden and dramatic dietary change; and lifestyle factors such as housing, sanitation and personal hygiene all contributed to the tuberculosis experience in this population. It is interesting to note that until 1928, the effect of medical intervention was not considered in the ecology of tuberculosis in the Indian population of Saskatchewan. The effect of medical care on the epidemiology of tuberculosis in the Saskatchewan Indians was not an element of the analysis in Ferguson (1928) because throughout the first several decades of the epidemic, no organized health services existed for the Indians.

In Saskatchewan, before World War II, medical services to the Indian population were no more than a skeleton emergency organization (Wherrett 1965:63). These services were characterized by several token attempts on the part of the federal departments responsible for Indians including the hiring of part-time physicians, occasional surveys and health education through the distribution of circulars to Indian agents on health-related issues.

During the period 1911-1927, the amount of money spent on Indian health services increased as did the provision of services. The impact of these measures on the health of the Indians, however, was negligible because they "were carried out without effective direction" (Young 1984:259).

A defined "Medical Branch" was created in the Department of Indian Affairs in 1927 (Canada. Dept. of Indian Affairs Annual Report 1928/29:7). However, the beginning of modern health services to the Indians of Canada was hampered by financial constraints due to the economic conditions through the 1930s and by inadequate staffing throughout the war years. Local initiatives of the Saskatchewan Anti-tuberculosis League were often heroic, although perpetually hampered by a lack of federal support. Although the effect of organized services and the implementation of anti-tubercular measures for the Indians on the population had been demonstrated in Saskatchewan in the Fort Qu'Appelle Indian Health Unit in the early 1930s, the real development of medical and public health services to the Indians was postponed until the years following the Second World War.

Young (1988:125) suggests that the improvement in the health status of the Canadian Indians during the post-war years can only partly be attributed to health services. Changes in other aspects of Native society such as diet, housing and sanitation, also contributed to improved overall health. Regarding tuberculosis however, improved living standards for the most part did not prevent infection. They simply gave added protection to the more resistant members of the community, and prevented small infections from developing into disease, but were little help to the non-resistant or those constantly exposed, including the Indians (Ferguson 1938:34). This suggests that the preventive BCG and case-finding programs funded by the federal government and conducted by the Anti-tuberculosis League in Saskatchewan in the 1940s and early 1950s, in a large part, account for the dramatic decrease in the tuberculosis death rate in the province. Young (1988:50) concurs and suggests that tuberculosis is the one disease where, in the short-term, medical care factors seem to have been remarkably successful in decreasing the disease burden.

When organized anti-tuberculosis programs were developed for the Indians in the years following the Second World War, these initiatives took two directions: active, preventive BCG immunization of the non-infected Indian population, and case-finding, isolation and treatment of tuberculous individuals.

In the late 1940s, and throughout the 1950s and 1960s, most active Indian tuberculosis cases diagnosed in Saskatchewan were hospitalized for treatment. Although the exact number hospitalized is not known, at least 10% of the Indian population of Saskatchewan received Indian hospital or sanatorium treatment throughout the first decade when those services were available to them. This proportion likely varied immensely in the different geographical regions of the province. For example, for the Qu'Appelle-File Hills area, where tuberculosis had been successfully battled for two decades, the percent hospitalized would have been much lower than for the north where case-finding only began in the late 1940s. Mason (1974) indicates that, in Alaska, more than 40% of the Natives in one community were hospitalized for tuberculosis over a 20 year period.

Interviews conducted with fourteen Indian individuals who had been hospitalized for tuberculosis treatment provided several interesting insights into tuberculosis from the individual patients' perspective. In addition, several recurring themes about the tuberculosis and sanatorium experience and some indication regarding the effect that this experience had on the lives of the individuals subsequent to their hospitalization emerged from the interviews.

With regards to a perspective on tuberculosis, two dichotomous views were presented. Several of the people expressed a fear of tuberculosis because of their familiarity with it. They grew up with it and lived surrounded by tuberculosis in their families and on their reserves. One of the women interviewed, knew about tuberculosis, and feared it, but was not familiar with it because there was no tuberculosis on her

reserve that she could remember, and she knew that there was none in her family. This perspective is unique. In contrast to the individuals who feared tuberculosis because of their familiarity with it, most of the people interviewed said that they were very familiar with tuberculosis, but they did not fear it. All of these individuals, except for one, were from reserves in southern Saskatchewan and they lived in fairly close proximity to either a sanatorium or an Indian hospital.

This general familiarity with tuberculosis suggests that all of those interviewed were aware of the social context of tuberculosis in their families and communities. In terms of what the individuals interviewed knew about tuberculosis from a biomedical perspective, most had some idea of its symptomology, though its specific etiology was not known. Most of the people interviewed, in the initial analysis, appeared to understand the infectious nature of tuberculosis by expressing their concern about their children or their families. They did not however, use the term infectious or contagious, and in general, they were not aware of the specific nature of the disease transmission. Their concern for their families appeared to stem from observations that tuberculosis was "in" particular families, not necessarily because they thought they could "give" tuberculosis to them. This family concern appears to again indicates a broad knowledge of the social context of tuberculosis, not a specific knowledge of the disease process from a western or biomedical perspective.

In terms of a perspective on the treatment of tuberculosis, most of the individuals interviewed appeared to be aware that hospital treatment was necessary, if not for their own health, so that the significant others in their lives did not get the disease. Archival sources and government annual reports, indicated that many Indians recognized the value of certain Western medical treatments and they took a very active role in seeing that their health needs were attended to. All of the individuals interviewed indicated that they were aware of the necessity of hospital treatment. No one refused to go to the

sanatorium, except for one woman who ran away several times. Most, however, plotted their escape time after time. This suggests that perhaps their stay in the sanatorium and hospital was not of their own volition. The interview schedule that was used did not include specific reference to whether an individuals' hospitalization was voluntary. Interview data, however, suggests that in several cases it was out of the individuals hands.

Based on several archival references, it was assumed that Indians wanted treatment, and once treatment was available to them, they embraced it with open arms. This was true in many cases, however, several suggestions made in the interviews indicated that many Indians may have gone to the sanatoria for treatment because they were forced to, or would be forced to if they didn't go willingly. For example, several individuals remembered parents who came at night and stole their children away. Others talked about the Indians who kept running away, and who, on the verge of death, were brought back to the hospital. One woman ran away from the Saskatoon sanatorium several times. Several individuals indicated that they went to the sanatoria because they knew they had to. It was assumed in the interviews that they knew they had to go for their health, in order to get better. However, they may have known they "had to" go for treatment because it was the law.

The most common theme about life in the sanatoria or Indian hospital revolved around the structured, regimented nature of the treatment. All of the people interviewed were on strict bed rest when they first arrived for treatment, and many said that they remained on strict bed though their entire stay. Several of those interviewed remembered quite vividly seeing other patients confined in strait-jackets and body casts. Several individuals distinctly remembered how strict the staff was with children.

Other observations about life in the sanatorium or Indian hospital included reference to a lot of Indian patients in the hospital who appeared to have allergies to the anti-tuberculosis drugs that they were given. Several individuals indicated that they

or others in the sanatoria were unfamiliar with food, especially all the vegetables. Many observed that there were many Indians in the sanatoria, that it was crowded, and that many of the Indian people were from the north. Two of the individuals interviewed, were ill with tuberculosis in the late 1960s. Both were hospitalized for several months before being diagnosed with tuberculosis.

For most of those interviewed, their stay at the sanatorium or Indian hospital was not portrayed as a bad experience. Because of the poor living conditions on many Indian reserves, a trip to the sanatorium or Indian hospital was a relief for some. Indian children in the sanatorium and hospital were given new clothes, toys, and books, and in some cases an education; things they did not get at home. One woman chose to remain in the sanatorium after her treatment regimen ended so that she could complete her education, something she could not do back at home in the north. In addition, the extensive social support network that the patient's had to draw on enabled them to cope with a potentially negative experience.

While they were hospitalized, all of the individuals who were interviewed knew several other people who were in at the same time, people who were their contemporaries from their own or surrounding reserves. All of the individuals also indicated that they made several lasting friendships with people that they met while in the san. In addition, all, except for one young boy, were visited frequently by their families and friends, and they indicated that their visitors made the time there more bearable.

The visitors, the contemporaries in the hospital at the same time, and the lasting friendships made with other patients, suggest that the Indian people interviewed were not "isolated" from their families and friends for the duration of their treatment. This is significant. It suggests that the hospitalization experience, for those interviewed, was not a traumatic disassociation from their culture. They knew many people in the hospital and

made many new friends. In fact, throughout the 1950s, most of the patients in the three sanatoria were Indians.

Because the people who were interviewed were not isolated in a foreign place when hospitalized, away from their families and friends, the effects of the hospitalization experiences on their lives appear to be minimized. The disruption of family life which Hodgson (1982) suggested would result from a parent being away in the sanatorium for an extended period of time, was apparent in the case of only two of the individuals interviewed, the only two individuals who were adults with families at the time of their hospitalization. The disruption caused in both of these cases suggests that further research may find this much more widespread.

The rest of the individuals interviewed were children or teens themselves when they were hospitalized. When asked why the experience may not have been that influential in her life, one woman suggested that it was not traumatic for her because she had no kids to leave behind, no one back home to worry about, no career interrupted, and no life to put on hold. For another, it was not that much of a disruption, because it was merely a continuation of the prison experience she was accustomed to from years of regimented, residential school life. Although some school work was available in the sanatorium and at the Indian hospital, when they left many were behind in their education, and they all said they found it very tough to get back into it.

In terms of the foreign ethos and language of sanatorium culture that Hodgson (1982) suggests must have had a substantial impact on the experience of the Inuit who were evacuated for treatment, for these individuals interviewed, this was not the case. Most of the people interviewed were from south-central Saskatchewan, and evacuation did not take them far from home into a foreign culture. In addition, all of the individuals who were interviewed spoke English. The number of Indians who were in the sanatoria at the same time suggests that the culture may not have been that foreign to them.

Regarding the long term effects of the hospitalization experience, most of the people interviewed felt that the experience did not have an influence on the future direction that their lives took. Only one of the individuals interviewed suggested that the experience was instrumental in determining the direction his future took. The young boy who spent the first two years when he should have been in school, in the sanatorium and at home resting, was pegged by his family as the "sickly" child. As a result, his family felt that he would be unable to help out around the farm and they decided that he was the one to receive the education. If he had been big and strong, like his brothers, he probably would have begun to work on the family farm after receiving his grade eight as his brothers did, and likely would not have gone to highschool or university.

8.2 Conclusions

This research examined several adaptations to tuberculosis among the Indian population of Saskatchewan focusing on three interactions within an ecological framework. Tracing the epidemiology and understanding the ecology of tuberculosis in this population defined the relationship in the ecological model between the organic environment and the human component of the model in terms of demographic and biological adaptations. The examination of health services in relation to health status delineated the role of health services in the ecology of disease in this population. The interviews with Indians who had been hospitalized for tuberculosis treatment explored the relationship between disease as an environmental variable and the individual in order to probe individual behavioural adaptation to disease.

Within the ecological model, beneficial relationship between organisms and their environments are established and maintained throughout this process of adaptation. Adaptation in human populations is facilitated by demographic, biological, and behavioural changes (Hardesty 1977:46). Throughout the course of human evolutionary

history, genetic and physiological mechanisms were supplemented with behavioural mechanisms when humans learned to function in complex social groups (Dubos 1968:83). This study has probed individual behavioural mechanisms and described the effects of tuberculosis on the Indians of Saskatchewan on two adaptive levels, the demographic/genetic and the biological/physiological. Disease chronologies which delineate these adaptations are a necessary first step in the examination of disease and Native American lifeways. However, they do not address issues of cultural change and adjustment (Trimble 1989:59). The ecological approach in medical anthropology is also concerned with the effect of disease and health practices on the culture itself (Moore et al 1980:10), and on cultural-behavioural adaptations to disease.

In examining the effects of disease on culture, most authors conceptualize demographic and genetic adaptations as part of what they call the cultural system. Therefore, in discussing the cultural effects of epidemic illnesses they tend to restrict their analysis to these quantifiable parameters (See McElroy and Townsend 1989). However, Moore (1989:128) suggests that we also need to know whether observed qualitative differences in Native societies can be clearly correlated with these quantitative population characteristics. The population ecology model used in this research allows one to extricate cultural adaptations from demographic and biological adaptations, through examination of the "social environment", as composed of these three components.

Although examination of the interaction between disease and the cultural component of the ecological model was beyond the scope of the present research, it was hoped that probing individual disease experiences and examining individual adaptations would indicate some areas in which to search for behavioural responses to tuberculosis at the cultural level.

Behavioural adaptation to disease may be technological, organizational or ideological (Armelagos et al 1978:76). In examining the effects of smallpox and other

epidemic illnesses on Native American culture, Hader (1986) delineated culture changes which occurred in response to the epidemic diseases in these three systems:

1. Ideological changes including long term attitude changes, to stoicism, demoralization, despondency and identity fragmentation; and changes to religious beliefs and practices due to the powerlessness of traditional religions and shamans to fight the epidemic illnesses including loss of faith in traditional religion, and acceptance of Christianity;
2. Technological or economic changes including the inability to maintain economic self-sufficiency and increased dependence on European goods (Hader 1986:26);
3. Social and political organization modifications and reorganizations, such as changes in major social institutions, changes in basic cultural symbols, and in marriage (Taylor 1977:66-68), and changes in population interactions such as decreased intergroup competition and interethnic amalgamation (Hader 1986:30).

In various analyses, using an ecological frame of reference, culture has been examined at different levels. Several authors recommend examination of change at the systems or institutional level (Armelagos et al 1978; Moore et al 1980; Bennett 1976). The difficulty in examining the relationship between broad ideological, organizational and technological systems transformations and tuberculosis in Saskatchewan is not in demonstrating that these changes occurred. The challenge lies in defining the role that disease played in the process. In the early 1880s when tuberculosis attained epidemic proportions in the Saskatchewan Indian population they had recently undergone a dramatic and sudden lifestyle change associated with the move to reserves. Involved in this relocation were changes in all of these systems. Traditional economic pursuits were no longer viable due to depletion of the bison herds. On the reserves the Indians were

expected to learn farming and considerable effort on the part of the government was put into turning these once nomadic hunters into sedentary farmers. In terms of the ideological system, once settled on the reserves, the Indians were a captive audience and were subjected to intense missionizing on the part of Christian churches, who also controlled the educational system. The ideology of a market economic system was also imposed upon them. Social and political organizational changes were precipitated by their new sedentary lifestyle and restricted territorial movements. As well, government policy attempted to restructure the political relationships on reserves through their insistence on an electoral process for determining band leaders and councils.

Because observing behavioural adaptation to disease is the goal and because of the difficulty in delineating correlations at the broad systems level, perhaps the cultural variables examined in ecological analysis should be at the level of cultural "traits". Specific cultural traits or behaviours which other authors have suggested should be examined in this interaction include: eating, sleeping and mating behaviours and cultural practices such as religious pilgrimages (Moore et al 1980:19); ways of defining social groups, ceremonial feasting and human sacrifice (Vayda and Rappaport 1968:494); taboos and other beliefs, cooking and eating habits and social customs (May 1957:112); child rearing practices, learned defence mechanisms and coping practices, family structure, the nature of family functioning and communication patterns within families (Lumsden 1975:213).

In Saskatchewan the systemic changes to Indian culture associated with reserve life and government administration served to undermine traditional culture. Certain behaviours such as the concept of reciprocal obligation within the family, however, persisted (O'Brodivich 1969:14). It is at this level of cultural traits/behaviours therefore that the effect of disease on Saskatchewan Indian culture may be discerned. Because examination of this cultural component of the model was beyond the scope of the present

research, some areas in which the effect of tuberculosis on culture change may be delineated are presented as recommendations for further study.

8.3 Recommendations for further study

As evidenced by the relative paucity of anthropological studies which examine interactions between disease and human populations further methodological and empirical research is obviously required in this area. In relation to the objectives and conclusions of this research some potential areas for further study include:

1. In order to establish a basis for comparison, study of the ecology and epidemiology of tuberculosis in other Canadian Indian populations is warranted. In addition, because of the variety of local epidemiological experiences delineated within Saskatchewan, more focused, local studies of the effects of tuberculosis on Indian populations should be undertaken to examine ecological interactions in more detail.
2. Health and tuberculosis services to the Indians of Saskatchewan could also be explored in more detail on a local level, to elicit more specific influences and adaptations. In addition, the role of health services should be examined using the new critical perspective in medical anthropology which takes into account broader political and economic processes in the production of sickness.
3. Information obtained from individual interviews appears to overlap in many instances, suggesting that further research may substantiate these findings. In addition, the impact of Indian tuberculosis on sanatorium life could be explored since sanatorium culture itself must have changed substantially after 1945 with the large numbers of Indian admissions. Regarding the sanatorium experience, the results obtained reflect the bias of the sample population interviewed. However, it is likely the experience was not the same for individuals evacuated from remote northern areas of Saskatchewan who did not speak english. The hospitalization experience for this population should also be

examined.

The interviews suggest that a wealth of qualitative information on tuberculosis is available from the perspective of the hospitalized patient. This whole area should be examined in detail, perhaps using an ethnomedical framework in examining cultural definitions of "illness experiences and behaviours".

4. Finally, cultural adaptations to tuberculosis in the Saskatchewan Indian population need to be explored. The effect of tuberculosis on the Indians of Saskatchewan on specific cultural traits or behaviours should be examined in terms of the effects of rapid and continual population decline at the beginning of the epidemic to the late 1920s; and the effects of long term hospitalization and chronic disability once tuberculosis was endemic in the population.

Possible culture changes perpetuated by population decline and hospitalization which could be examined include:

- i. Changes in traditional marriage patterns such as the relaxation of certain taboos due to the unavailability of marriageable individuals within the traditional intermarrying groups (Ewers 1973:112). Among the Cree traditionally parents preferred to chose husbands and wives for their children from among their own band (Mandelbaum 1979:146). This practice may have been modified in order to adapt to the decrease in the numbers of potential partners within the band. In addition changes in the practice of marriages as arranged by parents (Cuthand 1978:39), may have occurred when large numbers of parents succumbed to tuberculosis in its epidemic phase and individuals who had been hospitalized may have tended to marry at an older age and as a result had smaller families.
- ii. The impact on the success of adopting and maintaining a farming economy on the reserves. In discussing the White Cap Sioux, Elias (1988:183) noted that "From the late 1880s until the end of the first decade of the new century the

band numbered about fifty, but between 1905 and 1907 tuberculosis killed seven of the band's young men, leaving them with a much diminished labour force". During the years when a significant number of Saskatchewan Indians were hospitalized for treatment removal of the family members responsible for economic pursuits would have seriously jeopardized farming operations and increased the family's dependence on government rations and community support.

- iii. The disruption of family and community life which may have resulted in changes in patterns of family relationships (Hodgson 1982:509) such as significant role changes. For example, changes in the role of the shaman as a result of their inability to deal with epidemic tuberculosis; or changes in the roles of family members in economic activities and child-rearing practices where remaining family members would have to do each others jobs to fill gaps.
- iv. Changes in social activities for example those activities such as vigorous games or those which require a large number of participants.
- v. Changes to traditional kinship patterns necessitated by an increase in step-parent families, single parent families, adoptions, and remarriages. Campbell (1989:xii) suggests that many American Native groups restructured kinship bilaterally in order to adapt to depopulation due to disease. Krech (1978:710,724) suggests that a number of factors including mortality conditioned the change from matri-organization to bilateral and bilocal organization among the Arctic drainage Athapaskans. Depopulation may also have precipitated some relaxation of taboos regarding relationships between relatives such as sibling or mother in law avoidance (Mandelbaum 1979:126).
- vi. Changes in religious beliefs and practices and conversion to Christianity. Certain religious rituals may have been forgotten with the continued erosion of traditional knowledge when band members who retained that lore succumbed to tuberculosis

before they had a chance to pass it on. As well, rituals that proved useless against disease would have been dropped from the inventory (Trigger 1978:29) or altered to adjust to the new circumstances. In terms of acceptance of Christianity, O'Neil (1979:48) suggests that undoubtedly the epidemics perpetuated many conversions. Many Indians sought to be baptized because they knew that the Churches had food, clothes, medicines. Panic may also have provoked revitalization movements. In Saskatchewan, in 1904, the southern part of the province was set ablaze by rumours that the end of the world was at hand and that only Indians living in tipis would be spared (Barron 1988:31).

- vii. The effect of the acculturation of those individuals who were hospitalized such as in having trouble adjusting to reserve life once they returned and possible subsequent disruption and change of family and community life due to the high percent of individuals who were hospitalized and acculturated.
- viii. A resultant fear of future illness and hospitalization (Hodgson, 1982). Several of the individuals interviewed indicated that today they are extremely diet and health conscious.
- ix. Community disruption may have been precipitated by the migration of families to cities to be near family members in the sanatoria or migration of the entire reserve population. In 1917 the Wahpeton Sioux band left their old reserve and moved to a site nearer to the city of Prince Albert "to escape the tuberculosis and influenza that had taken the lives of so many" (Elias 1988:219).

ARCHIVAL SOURCES

PUBLIC ARCHIVES OF CANADA (PAC) Records of the Department of Indian Affairs (PAC RG10).

Record Group 10, Records Relating to Indian Affairs, date from 1677 to the present. Information from the several departments that have been responsible for Indian Affairs through the years are periodically transferred to the public archives holdings.

Agency Records, 1857-1971

<u>Volume</u>	<u>File</u>	<u>Title</u>
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1392	67	File Hills - Qu'Appelle Agency, Saskatchewan, General Correspondence and Circulars, 1909 - 1922; Correspondence from J. D. McLean, Jan. 14, 1911, to Teachers in Indian Schools.
1392	329	File Hills - Qu'Appelle Agency, Saskatchewan, General Correspondence and Circulars, 1909 - 1922; Circular from the Department of Indian Affairs, Ottawa Regarding additions to Agents Annual Reports.
1392	334	File Hills - Qu'Appelle Agency, Saskatchewan, General Correspondence and Circulars, 1909 - 1922; Circular No. 4, Office of the Indian Commissioner, Regina Regarding Monthly Reports.
1392	402	File Hills - Qu'Appelle Agency, Saskatchewan, General Correspondence and Circulars, 1909 - 1922; Letter from J. D. McLean in Ottawa, November 7, 1918, to Agent George B. Stanton, Balcarres, regarding the influenza outbreak.

<u>Volume</u>	<u>File</u>	<u>Title</u>
1392	427	File Hills - Qu'Appelle Agency, Saskatchewan, General Correspondence and Circulars, 1909 - 1922; Letter dated January 10, 1919, from J.D. McLean, Ottawa regarding Indian children orphaned by the 1918 influenza epidemic.
1392	437-8	File Hills - Qu'Appelle Agency, Saskatchewan, General Correspondence and Circulars, 1909 - 1922; Circular to Indian Superintendents and Agents from J.D. McLean, Ottawa, Mar. 9, 1919; regarding Precautionary sanitary measures.
9143	pt2	File Hills - Qu'Appelle Medical Reports, 1926 - 1928; Letter from Dr. R.G. Ferguson, March 12, 1927, to Mr. W.M. Graham, Commissioner, Department of Indian Affairs, Regina, regarding the Colony Hospital, File Hills Reserve.
9133	80-12	Muscowpetung Health, 1939-1949; letter from Dr. Simes, Sept. 6, 1939, to the Chief and Councillors, Muscowpetung Band, regarding upcoming x-ray survey on the reserve.
9148	76-12B	Office of the Inspector of Indian Agencies, Saskatchewan, 1923-1949; Letter from Dr. G.B. Isman, physician, March 24, 1941, to Mr. Frank Booth, Indian Agent, Muscow, Saskatchewan; regarding Tuberculosis Enquiry, Circular No. 1061.
9130	20-99	Duck Lake Agency Doctor 1916 - 1937; Correspondence from J.D. McLean, Sept. 19, 1916, to Dr. Montreuil, Prince Albert, Saskatchewan regarding his appointment as Duck Lake Agency Doctor.
9085	36-37	Daily Journals Onion Lake Agency, 1889-1939. Books 36 and 37, 1936 and 1937 Onion Lake Agents Daily Journals.

<u>Volume</u>	<u>File</u>	<u>Title</u>
9084	17	Daily Journal Onion Lake Agency, 1889-1939. Book 17, 1921 Daily Journal, Meadow Lake.
1015	193	Battleford Agency Medical Reports Doctor's Correspondence, 1908-1919. Dr. Millar's Health Report, Sept. 14, 1918 for his visits to Poundmaker and Little Pine reserves, to Agent Rowland.
1015	211-15	Battleford Agency Medical Reports Doctor's Correspondence, 1932-1935. Correspondence regarding admission of John Albert's children for sanatoria treatment.
1015	230	Battleford Agency Medical Reports Doctor's Correspondence, 1932-1935. Correspondence to Dr. Norquay, June 13, 1935 regarding sanatoria admission for the child Lena Alexander.
1015	507-8	Battleford Agency Medical Reports Doctor's Correspondence, 1932-1935. Correspondence to Dr. Norquay from R.G. Ferguson, Nov. 20, 1933, regarding the results of a tuberculosis survey at Delmas Residential School.

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APPENDIX A:
THE INDIANS OF SASKATCHEWAN

The Indians of Saskatchewan

Mainly for logistic reasons, interviews which were conducted in the course of this research focused on two cultural groups in Saskatchewan, the Plains Cree and the Assiniboin.

The Plains Cree and Assiniboin of southern and central Saskatchewan are two of the Plains Indian tribes described in Lowie (1982:2-4) based on linguistic affiliation. Dialectical differences between the eight Plains Cree bands in the 1800s were minor (Mandelbaum 1979:11). Often allies, the Cree and Assiniboin camped together and intermarried.¹ Following the establishment of reserves several Assiniboin groups permanently attached themselves to Cree peoples (Mandelbaum 1979:8).

Pre-Reserve Culture

Until the early 1880s the Plains Indians inhabited an immense geographical area between the Mississippi and the Rocky mountains and the adjacent area of Canada. The physical geography of the Plains is characterized by short grasses, an average annual rainfall of less than 20 inches, scrub vegetation, and a lack of trees. In the Prairie zones in southern Alberta, Manitoba and Saskatchewan rainfall may be as great as 30 inches and long grasses predominate. Characterized by much diversity, the Plains Indians shared a sufficiently large number of cultural traits to represent a distinctive mode of life (Lowie 1982:1-2,5).

The Plains people were large game hunters, depending for most of their diet on bison and using the skins for clothing; they depended very little on fish and smaller game such as rabbits. The Cree and Assiniboin were experts at a method of hunting in which bison were lured into and impounded in a corral structure (Lowie 1982:5,14). The migrations of the bison herd regulated tribal movements (Mandelbaum 1979:52). Wild vegetable food, berries, and tubers such as the Indian turnip extracted with a digging stick, supplemented the diet (Mandelbaum 1979:74-75; Lowie 1982:14). Because fresh

¹ One of the eight bands of Plains Cree that Mandelbaum identified in the 19th century was known as "nehiopwat", Cree-Assiniboin, because of its close relations and intermarriages with the Assiniboin (Mandelbaum 1979:9).

meat was not always available, pemmican, meat preserved by drying and pounding and mixing with dried paste from wild fruits, was common. Among the Cree, tobacco, used mainly for ceremonial occasions, was obtained through trade with neighbouring groups (Lowie 1982:25-27). Among the Assiniboin both men and women smoked tobacco, and the carving of stone pipes reached a high degree of artistry (DIAND 1986b:5). The only domesticated animal among the Plains tribes was the dog. Dogs were employed either to carry loads on their backs, or to pull a crude triangular shaped "travois", which was later adapted to use with horses. The horse, introduced by the Spanish, turned the Plains tribes into equestrian nomads by the eighteenth century (Lowie 1982:5,39).

The absence of permanent houses was characteristic of the Plains groups. Because of the availability of skins and necessitated by the nomadic nature of their subsistence pursuit, the Indians lived most of the year in conical skin covered tents (known as tipis) (Lowie 1982:5).

Early census information is not available for the Plains tribes, however, several population estimates suggest low population densities, and declining populations into this century mainly due to the impact of the newly introduced infectious diseases. The number of Plains Cree estimated to be 4,000 in 1835, decreased to 1,000 by 1858. Likewise the Assiniboin which numbered 8,000 in 1829, had decreased to 2,800 by 1920² (Lowie 1982:6). In Canada, the Dominion Blue Book fixed the Assiniboin population of Alberta and Saskatchewan at 1,042 in 1890, a decline from an estimate of 3,040 in 1842 (DIAND 1986b:4).

Plains band level social organization reflected these low population densities, a dispersed populations, and a nomadic existence. In most Plains groups the family or a union of a few families made up the local group for most of the year. Social and religious activity with a larger group was only possible from late spring to early winter (Lowie 1982:87). In the nineteenth century, eight loosely organized Plains Cree bands were recognized (Mandelbaum 1979:9). The bands were characterized by flexibility, a Plains Cree could freely pass from one to another (Lowie 1982:89).

² These population estimates which include all North American Cree and Assiniboin are based on the work of James Mooney, A.L. Kroeber and J.R. Swanton (Lowie 1982:6).

In addition to band membership, Plains Cree men could also belong to a Warrior society (Lowie 1982:100), the society of "Worthy Young Men" (Mandelbaum 1979:110); the title applying to anyone who had displayed bravery and daring. Lowie (1982:104,106) suggests that the main objectives of warfare were revenge, horse theft, and the lust for glory; bravery in warfare being the path to distinction. Oliver (1962:18) suggests that on the Plains the presence of competing human societies put a premium on military skills. The last great war on the Canadian Plains between the Cree and the Blackfoot occurred in 1866 (DIAND 1986b:3).

In terms of political organization, Plains culture was generally democratic. There was some rank distinction in which the children of a chief may enjoy certain favours, though heredity did not necessarily determine that a chief's son would someday become a chief. The role of the chief was an honorary role in which the bearer had little authority. Power exercised within the group was generally in the hands of all responsible men who had achieved a level of eminence through their war record and generosity (Lowie 1982:112-113).

Although the Plains cultures had no courts of law, legal concepts were not absent. Sometimes religious ideas influenced a groups attitudes to certain behaviours, however, the main deterrent for antisocial behaviour lay in the power of public opinion. Indians were extremely sensitive to gossip that might jeopardize their social standing (Lowie 1982:114). For example, among the Cree, ridicule was the best means of prodding indolent individuals into aiding in band collective efforts such as hunting (Mandelbaum 1979:78).

Within the local group little trading took place. The necessities of life were shared freely through rights of reciprocal obligation (Lowie 1982:115). Intertribal trade was common, and the effects of trade with the whites were far reaching. Two innovations due to contact with the whites, the horse and the gun, dramatically changed the Plains Indians subsistence strategies, as well as other aspects of their culture. The horse, which came to be the mainstay of the Plains Cree "prestige economy", facilitated a rise in social status (Mandelbaum 1979:51,62), and created great differences in wealth and prestige within groups. The acquisition of the gun allowed the Cree to crowd out their western neighbours and precipitated their change from a Woodland to a rather typical Plains

people. Because of trade with the whites the Plains Indians also adopted new foods and stimulants, metal utensils, cloth and steel knives, and a large portion of their traditional culture became obsolete, fragments only being retained for ceremonial occasions (Lowie 1982:117).

The supernatural of the Plains cultures pervaded every sphere of social life. The shaman, a religious specialist who attained power through a personal communication with the supernatural was characteristic of most Plains groups. One of the main roles of the religious specialist in Plains cultures was healing, however, the treatment of illness did not always involve the intervention of the supernatural. Plains groups also had herbs and potions known for therapeutic effects, and they used medical techniques such as massage, smoking, bleeding and cupping. The sweat lodge commonly used in ceremonies was also used for healing by some Plains groups (Lowie 1982:155,162-163).

The concept of a single, all powerful creator dominated Plains Cree religious ideology and ceremonialism (Mandelbaum 1979:157). Although many Plains groups shared a universal belief in the survival of the soul, there was no notion of reward or punishment after death, no ancestor worship, and no elaborate conception of the posthumous existence. In general, they believed that the dead lived much like they did when they were alive, hunting buffalo, playing games and living in tipis (Lowie 1982:164).

The Plains were rich in ceremonialism. In addition to sweats and sun dances, Cree and Assiniboin ritual observances included for example a rite of passage, involving a four day seclusion, to demarcate a girl's coming of age. While menstrual taboos excluded some women from participation in ritual, in general wives aided their husbands in sacred rites. Rituals were performed either separately or a part of larger groups, and included offerings and prayer, sweats and the singing of sacred songs often taught in a vision (Lowie 1982:166-168).

In the 1880s, with the extermination of the bison and the relocation of the Indians to reserves, the lifestyle of the nomadic bands changed drastically. Within one year the Plains Indians underwent a total change from a diet of fresh buffalo meat to a ration diet consisting mainly of white flour bannock and salt pork (Ferguson 1928:33). Dramatic housing and sanitation changes were also associated with a sedentary reserve lifestyle. Settling on reserves in village units of 100 to 300 individuals, lodges and tents were

replaced by log houses and sanitary habits remained unchanged for the first decade (Ferguson 1928:37).

The Early Reserve Years

Life on Saskatchewan Indian reserves, for the first several decades of their existence, was influenced if not determined by the interpretation and administration of the laws of Canada pertaining to the Indians by Indian Affairs, and the local Indian agents, as well as by the religious and educational policies of the Christian missionaries.

Before 1867, responsibility for Canada's Indians had passed from the colonial military of the British forces, to the Commander of the forces in the British North American Provinces, to the civil control of the Indian Department (Ponting and Gibbins 1980:4). Throughout the 1840s investigations into the plight of the Canadian Indian resulted in legislation in Lower Canada which defined an "Indian" for the first time (Tobias 1983:41); and in recommendations that measures were required to protect Indians and their lands from squatters, poachers, and the eventual intrusion of settlers (DIAND 1986b:55; Ponting and Gibbins 1980:5).

Responsibility for the Indians was transferred to the province of Canada (Department of Indian Affairs Annual Report July 1, 1936:8) in 1860. By this time, all three of the overriding principles of Indian policy, protection, civilization, and assimilation, were established. The development of Indian policies and administration well into the twentieth century reflect these goals. After 1867 there was a change in emphasis: protection of the Indian and his land ceased to be of paramount concern, civilization remained important but was regarded as a gradual long term process, and assimilation became the goal (Tobias 1983:39,43).

Recognizing that Indian interest in the land could be extinguished only by formal bilateral agreement, the British system of Indian treaties lay the fundamental basis for Canadian Indian policy (MacInnes 1946:387). The major treaties with the Indians of Canada were signed between 1871 and 1921. The first two treaties incorporated most of the province of Manitoba (DIAND 1980b:57-58). Five treaties were signed during the 1870s. Treaty number Three secured a valuable section of north-western Ontario from the Chippewas, and Treaty number Four, the Qu'Appelle Treaty, extinguished the title

of the Crees of the plains to the desirable agricultural land comprising what is now southern Saskatchewan. Treaty Five was concluded in September 1875 with the Chippewas and Swampy Crees of Manitoba and Ontario. Treaty Number Six was negotiated with the Plains Cree, the Woods Cree and the Assiniboin in 1876, and Treaty Number Seven with the Blackfeet, Blood, Peigan, Sarcee, and Stony of Alberta followed in 1877 (Graham 1949:22).

Treaty Eight was signed 22 years later with the Indians who lived south and west of Great Slave Lake, in 1899. Treaty Nine was signed with the Indians of Northern Ontario in 1905 and 1906. Treaty Number Ten, with the Indians of those portions of Northern Saskatchewan not covered in earlier agreements, was signed in 1906 (Graham 1949:22). The last treaty, Treaty Number Eleven, was signed by the Slave, Hare, Loucheux, and Dogrib Indians of the North West Territories in 1921 (DIAND 1980b:60).

All eleven treaties were similar in content. With minor variation, they provided for reserve land, monetary payment, suits of clothing every three years to chiefs and headmen, yearly ammunition and twine payments (except for treaties 1, 2 and 9), and some allowances for education. The only treaty to make allowances for medical treatment was Treaty Number 6 (DIAND 1980b:58).

At Confederation, control of Indian Affairs was given to the Federal Government. Once the transfer occurred numerous legislation pertaining to Indians were consolidated into the Indian Act of 1876 (MacInnes 1946:388). In the hands of the Federal government, Indian administration, effectively delineating and limiting the terms and conditions of Indian life on the reserves following the signing of the treaties, was defined by this Indian Act. The first Indian Act of 1876 incorporated existing legislation and entrenched them in one document that would dominate Indian Affairs for the next century (Ponting and Gibbins 1980:8).

The 1876 Act defined the relation between the Indians and broader Canadian society. It defined an Indian; it retained the governments guardianship of Indian lands; and it set forth a process of enfranchisement believing it would facilitate Indian assimilation. The Act laid down a framework for limited Indian local government through the election of chiefs and councils (Tobias 1983:44); and it aimed to protect Indians by restricting their contact with the white society. In addition, the Act gave

sweeping powers to the Federal Government through its administration in the Indian communities by Indian agents who had an extraordinary range of discretionary powers (Ponting and Gibbins 1980:8-12).

This Act gave the power to the government to control Indians life on reserves. It forbade the selling, alienation, or leasing of any Indian reserve land unless it was first surrendered or leased to the Crown; and although the act provided for the election of Indian band chiefs, it gave them limited authority (DIAND 1980b:60-61). The Act and subsequent amendments attacked traditional Indian values, and was aimed at annihilating these traditional values through education, religion, new economic and political systems, and a new concept of property (Tobias 1983:44-45).

The principle policy goal of the Act was assimilation (Ponting and Gibbins 1980:12). Lowie (1982:195-196) suggests that attempts to assimilate the Indians by educating them, and teaching them to farm created innumerable problems. Many groups did not want to take up a sedentary lifestyle nor emulate their neighbours. In terms of farming, gardening was traditionally the work of women, and under this new system men were expected to do the planting. In addition, most reserve land was not amenable to farming or required irrigation.

The new spirit of individualism, characteristic of Western economics, created additional problems. The Plains tribes were individualistic in matters of prestige, but economically the reverse; food and other goods were shared freely with anyone, at least kinsfolk. As a result, a potentially successful farmer would be torn between his tribal ethics and the new rules of a market economy. Many individuals in fact gave up the opportunity for individual prosperity to hold on to their customs. Within the new order, an important personality problem for Indian males became finding a suitable "goal" in life. With the buffalo gone and warfare a thing of the past, many found it hard to find any objectives that made life worth living.

Throughout the first two decades of the twentieth century, conditions on Indians reserves, in social services, health, education, and general living facilities deteriorated. Feelings of frustration with the system were replaced by hopelessness and despair (Cuthand 1978:41). Writing in 1923, in an attempt to urge his people to look ahead, Edward Ahenakew used the voice of a fictitious character, an old man, to tell of the

experiences of his own youth. Logically as the "storyteller", this old man should have commanded the respect or had the authority of great Chiefs of the past. Contrarily, Ahenakew portrayed him as poor, inoffensive and genial, naming him "Old Keyam", from a Cree word Ahenakew interpreted to mean "I do not care". Old Keyam had, in his youth tried to fit into the new life, had tried to conquer, and had been defeated (Buck 1973:13). "In 1923, such withdrawal was the only alternative if an Indian could not agree to Government or Church policy" (Buck 1973:13-14). That word 'keyam', Ahenakew later wrote, "expresses the attitude of many Indians who stand bewildered in the maze of things, not knowing exactly what to do, and hiding their keen sense of defeat under the assumed demeanour of 'keyam'! - while in fact they do care greatly" (Buck 1973:20).

In response to continued discouraging conditions on the reserves, a period in growth in awareness for Native people characterized the decades between the two great wars. Contact with other societies around the world lent insight and gave new hope to the returning veterans and laid the foundations of political unity³ (Cuthand 1978:41).

The 1920s and 1930s

In the 1920s and 1930s, leaders of Indian movements for self-determination emerged from among the ranks of the Indian war veterans. These men who had served their country overseas came home to reactivate Pan-Indianism and to bring about a united effort for better education, ownership of land and property, and improvements in health programs (Cuthand 1978:31). Although the first organizational meetings of the League of Indians of Canada were held in the east, their real strength lay in the western provinces. Three early meetings were held in Elphinstone, Manitoba, on the Thunderchild reserve in Saskatchewan and at Hobbema, Alberta from 1920 to 1922. At Hobbema, Edward Ahenakew was elected the provincial president for Saskatchewan and James Wuttunee from Red Pheasant Reserve was elected provincial treasurer. Following the Hobbema meeting in 1922, annual meetings were held in Saskatchewan; the Treaty Six area had the most active membership (Cuthand 1978:32).

³ More than 4,000 Canadian Indian men voluntarily enlisted during WWI, representing 35% of the eligible male population from the nine provinces (From the Report of Duncan Campbell Scott, Deputy Supt. General of Indian Affairs, Ottawa, Dec. 1, 1919).

The movement towards Indian unity was revitalized in 1929 when the League of Indians of Western Canada was formed by Chief Joe Taylor at Green Lake, Saskatchewan. Throughout the decade of the 1930s, the mandate of the League was to create a political voice to improve reserve conditions. A number of resolutions were passed including the establishment of reserve schools to augment industrial and boarding schools; the provision of extra rations to old people; a halt to further land surrenders; the preservation of Indians hunting, trapping and fishing rights; and the creation of economic assistance programs for individuals and bands. The League also made demands upon Indian Affairs including that: only fully qualified teachers be employed in residential and boarding schools; all farm instructors and interpreters be removed from Saskatchewan reserves and the money saved be channelled into old age pensions; and that section 45 of the Indian Act dealing with the permit system be abolished. Various resolutions concerning individual band land issues and requests for economic assistance were also passed. The only demand that Indian Affairs granted was the employment of qualified teachers (Cuthand 1978:33-4).

The strength of these early Indian organizations lay in their persistent attempts to lobby for change. At the time of the fiftieth anniversary of the signing of Treaty Six, however, only minimal improvement in housing, health services, education and economic progress for the Indians had taken place and the double standard, one dealing with non-Indians and one for Treaty Indians, continued to be enforced ⁴ (Cuthand 1978:35).

Indian educational policy throughout the 1920s was directed towards the improvement of educational facilities rather than improving standards of education through the curriculum. Responsibility for Indian education lay in the hands of the Christian Churches subject to the supervision of Indian Affairs which provided financial subsidies based on attendance records (Cuthand 1978:35). In 1923, this Federal funding was increased to encompass all of the capital expenses at Indian residential schools. In addition, grants to attend high schools, universities and business colleges were offered to graduates of Indian schools who showed promise. To be eligible for funding, a student

⁴ For example into the 1920s the permit system which restricted Indian travel off their home reserves was still being enforced by the Department.

was required to pass grade eight by the age of fourteen. Many Indian children, however, did not begin to attend school until age eight, ten or even twelve, and inevitably the program failed (Cuthand 1978:36). In 1928, free universal education was extended to the Indians of Canada (DIAND 1986b:16).

As was the earlier trend, the emphasis in education throughout the 1930s was placed on manual training and vocational instruction, and most residential schools came to include self-sufficient farms of several hundred acres. During this time, school administrators disagreed about the best way to educate the Indians. Many felt that children should be boarded and taught away from the influence of their parents, while others advocated for day schools on reserves in order to work more closely with parents (Cuthand 1978:36). The main problem with day schools on reserves was irregular attendance. For example, although the Little Pine day school registered an enrolment of 17 children in 1909, between then and 1920 the schools attendance varied from 0 to 17 students; the school was closed in 1920 for non-attendance and it remained closed for 2 1/2 years (Buck 1965:55). This fluctuation was attributed in part to continued Indian seasonal mobility. Although some parents recognized schools would help their children understand "White man's ways", many had been through the system themselves and most refused to force their children to enter the alien boarding school environment. This was a period of division and confusion on many Indian reserves. Parents who supported the church were pitted against those who felt short-changes in their education because of the role of the Church (Cuthand 1978:37).

In terms of the economic situation during the 1920s and 1930s, most Indians participated in a variety of part-time pursuits. These included: selling horses to settlers moving into the area; selling dry wood to farmers and town folk in the winter and hay in the summer; cutting brush throughout the summer months and harvesting in the autumn; and trapping small game in late fall winter and early spring. Some families were able to make a living as farmers and ranchers (Cuthand 1978:38). The Department of Indian Affairs Annual reports suggest that in 1921 most of the Indians in Canada were economically self-supporting through agriculture, stock raising and wage labour (Duncan Campbell Scott, Deputy Supt. General of Indian Affairs, Ottawa, June 25, 1921). By 1937, due to a decline in the demand for wage labour and recurring crop failure through

the depression years, many Indians were in need of assistance (Department of Indian Affairs Annual Report 1935-36:10).

In the 1920s, the old timers on the reserves, never having spent a day in school, reminisced about the days of the buffalo and the warrior societies. They were proud and independent and passed on their stories and legends to the new generations, rejecting for the most part the ideas of the agents and missionaries. These people lived on monthly rations and supplemented their diets with wild game when available. They were not too badly off, though they sometimes ran out of tobacco (Cuthand 1978:38). During the decade of the 1930s, this proud older generation came into conflict with the generation who had been to school. Many youths opposed family arranged marriages; refused to accept the traditional role of submitting to the wishes of their fathers; and questioned traditional customs such as giving away horses to visitors. The more educated Indians scoffed at Indian rituals and refused to participate, and they spoke English, not their native tongue. The more traditional families ignored all of this and continued to show their Indianness by renewing themselves at sweats and feasts, restoring relationships and kin ties at sun dances no matter how far removed they were from their ancestors and despite opposition from Indian Affairs. When sun dances were outlawed, they went to exhibitions and fairs to meet and renew friendships; kinship remained strong (Cuthand 1978:39).

Government health service on the reserves in the 1920s were in the hands of travelling nurses whose main role was the inspection of schools and homes, giving assistance and advice. Their efforts were generally opposed by medicine men and midwives and much of their work was met with resistance; they were often driven away from homes and suspected of causing illness to advance the depopulation of the reserves (Cuthand 1978:39). Despite living in what the government saw as unhealthy conditions, the overall health of Canadian Indians improved during this period. Following the population nadir in 1922, and despite continued epidemics, by 1923 the population of the Indians of Canada was increasing (Cuthand 1978:40).

In 1934-35, when David Mandelbaum, the Plains Cree ethnographer, was doing his field work among the Cree of Saskatchewan he noted that: penned into smaller and smaller areas, cut down by disease, economically pauperized, the Indians subsist on small-

scale farming and government grants. On all reserves Cree is the common language; much of the old ceremonialism, and especially the sun dance, flourishes; shamans are feared and respected; quillwork, tanning and moccasin-making, and many other aboriginal techniques are practised (Mandelbaum 1979:5,43).

Post World War II

Little attention was paid to Indian matters during the period in Canadian history characterized by the economic crisis followed by the second World War (1933-1945) (Tobias 1983:51). After 1945, interest in the Indians' situation increased. Public concern, spawned by the massive Indian contribution to the War effort, focused on the treatment of the Indian as a second class citizen (Tobias 1983:51). The most substantial changes occurred in 1951 with a new Indian Act. This act was introduced following a detailed review of Indian administration in 1946-1948 (DIAND 1980b:61), when concerned Canadians including Veterans groups, churches and citizens groups demanded a Royal Commission (Tobias 1983:51). A Royal commission was not appointed, but a joint committee of the Senate and the House of Commons was created to study the situation and formulate recommendations (Tobias 1983:61). Following consultation with Indian groups a revised Indian Act was passed in 1951 (DIAND 1980b:61). Like its predecessor, this revised act was framed to promote the integration of Indians into greater Canadian society (Dunning 1962:210 in Ponting and Gibbins 1980:13). The main features of the earlier act were not altered, although the revision reduced the degree of government intrusion into the cultural affairs of Indians, for example, the Potlach Prohibition was repealed (Ponting and Gibbins 1980:13).

The provisions of this new Act included: the definition and registration of persons entitled to be Indians; the management of surrendered and reserve land; management of tribal funds; the election and powers of band councils; individual and band enfranchisement; and the education of Indians (Dept. of Citizenship and Immigration, Indian Affairs Branch Annual Report 1951:42). A comparison of the 1951 Indian Act with the Indian Act of 1876 indicates only minor differences. In format, content, and intent they are similar. Both provide for cooperation between government and Indians towards the ultimate goal of assimilation (Tobias 1983:53). Although the Indian Act has

been subjected to frequent review and amendment since 1876, at the end of the 1960s it did not differ significantly from the original legislation (Ponting and Gibbins 1980:13-14).

On the Indian reserves, after briefly sharing in the period of general post-war prosperity, economic conditions took a down turn through the 1950s. This occurred when income from agricultural pursuits began to decline, opportunities for seasonal and casual employment around the reserve were reduced, and many Indians sought full-time employment off the reserve and chose to migrate to urban areas during an era of post-war industrial development ⁵ (Dept. of Citizenship and Immigration, Indian Affairs Branch Annual Report 1957-58;1958-59). The need created by this growing migration off the reserves and the continued goal of Indian assimilation is reflected in a shift in Indian Affairs branch prioritizing and programming in the late 1950s and early 1960s. For example, in Saskatchewan, employment placement programs began in 1959. During that year, forty-one 'permanent-type' jobs were found for Indians in non-Indian environments, where the Indians were reported to be "adjusting well". Conditions on the reserves in areas such as control of education, health and housing, according to the Annual reports continued to improve through this period (Dept. of Citizenship and Immigration, Indian Affairs Branch Annual Report 1960-61:80).

A survey of Indian participation in Canadian economic and political life was commissioned in 1963 and released in 1966. A Survey of the Contemporary Indians of Canada: A Report on Economic, Political, Educational Needs and Policies (The Hawthorn Report), was intended to provide guidelines for future Indian policy, examined reserve educational, economic, and political conditions (Dept. of Citizenship and Immigration, Indian Affairs Branch Annual Report, 1963-64; Ponting and Gibbins 1980:15-16).

The report found that only 6% of the Canadian Indian children who entered school in 1951 stayed until Grade 12; 8441 of the 8782 students in this cohort did not

⁵ Because of the rapid growth of the Indian population throughout the fifties, and continued migration to urban areas to find employment, by 1960, 26% of the Indians of Canada lived off the reserves (Department of Citizenship and Immigration, Indian Affairs Branch Annual Report 1960).

complete highschool. Most dropped out between grades 1 and 2, and after grade 7. In addition, it found that in this time period, 80% of Indian children repeated grade 1, and many repeated it three times. Only 12% of the Indian students were in their proper age-grade (Hawthorn Vol. 2 1966:130-132). The report suggested that this discouraging situation was the result of several factors including: the values inherent in the education system; negative experiences and early failures of Indian children entering school; a lack of support from Indian parents and communities; and a school administration that was insensitive to the needs of Indian children (DIAND 1980a:46). Recent changes indicate that education levels have improved since the early 1960s. In 1976, the percent of Indian children remaining in school until grade 12 had increased to 20% (as compared to 75% of the non-Indian population) (DIAND 1980a:47).

In terms of the economic situation, the Hawthorn report found that among Indians of working age (comprising 45% of the population), only 28.5% worked for more than nine months of the year, 61% were employed less than six months, and 23.6% worked less than two months a year. Average earnings for an Indian in the early 1960s were \$1,361, compared to \$4,000 for a non-Indian (DIAND 1980a:46; Hawthorn Vol. 1 1966:46).

The report suggests that the main reason for the economically depressed and under-employed status of Canada's Indians is their occupational distribution in jobs that are seasonal in nature and yield inadequate incomes. In 1964-65, almost one-half of the jobs held by Canadian Indians were in their traditional field of employment, in primary resource-based industries and occupations including forestry, fishing, trapping, guiding, food-gathering and handicrafts.⁶ 27.2% of the remaining employment was in the unskilled category, and only 14% fell into the skilled category characterized by high wages. While they represented only 14% of the jobs, these skilled workers accounted for almost one-half of total earnings (Hawthorn Vol. 1 1966:53).

Transfer payments represented 31.4% of total earnings from employment. These included: unemployment insurance, family allowances, old age security and old age

⁶ Because the sample in the study was weighted on the side of the more urbanized, developed bands, the proportion of the population depending on these sources of employment is probably higher (Hawthorn 1966:53).

assistance, and welfare payments from band revenues and public sources (Hawthorn Vol. 1 1966:46). Although the report found that geographical factors of distance and isolation from job centres were important factors which contributed to the depressed economic situation, the Hawthorn report concluded that "the forces impeding the economic development of Indians are social, cultural or psychological" (Hawthorn Vol. 1 1966:54-55).

Recent trends in terms of the Indian economic situation, indicate that Indian participation in the national economy increased only marginally in the 15 years following the Hawthorn report, and migration off the reserve to find employment had accelerated throughout the 1960s and 1970s. In 1966, 23% of the Canadian Indians in the young working age-groups (25-44) lived off the reserve. In 1976 this figure had increased to 33% (DIAND 1980a:58,135).

In terms of Indian political organization, throughout the 1950s and 1960s most Indian communities continued to be administered by Indian Agents. Most bands had neither the finances nor the institutional structures to take over the administration (DIAND 1980a:82). In January 1966, for example, only 22% of all the bands in Saskatchewan, administered part or all of their revenue monies (Hawthorn Vol. 1 1966:207). In terms of the powers of Indian bands to pass by-laws (Section 80) and money by-laws (Section 82), in Saskatchewan, in 1966, only 1 band of 67, or 1.4%, had these powers. In comparison, for all of Canada, 38 of 551 bands (7%) were deemed to have reached the required "advanced stage of development" and were allowed to pass money by-laws (Hawthorn Vol. 1 1966:266).

In addition to the painfully slow evolution of self-determination for the bands on the reserve, into the 1960s Indians continued to have no national political voice. Bands remained politically isolated from one another because they lacked the resources and training for political action and because no permanent national unifying organizations existed which could air their collective demands. Although they were given the Federal vote in 1960, the Indians also chose to remain isolated from non-Indian political structures (DIAND 1980a:82).

APPENDIX B:
EPIDEMIOLOGICAL METHODOLOGY

Epidemiological Methodology

Mortality measures the amount of death in a population, from all causes or from a specified cause.

1. Mortality rate. For total deaths in a population the death rate is usually expressed in terms of number of deaths per thousands. For specific causes of death, such as tuberculosis, this rate is expressed in terms of deaths per 100,000.

The rate is calculated using three elements: A population group exposed to risk of death (the denominator); a specified time period; and the number of deaths occurring in that group during the specified time period (numerator).

The formula is:

$$\begin{array}{lcl} \text{Annual Death} & & \text{Total number of deaths during a} \\ \text{Rate per} & = & \text{specified 12 month period} \\ 100,000 & & \hline & & \text{Number of persons in the} \\ & & \text{population} \end{array} \times 100,000$$

(Lilienfeld and Lilienfeld 1980:71-72)

The above calculation provides what is known as a "Crude" mortality rate. Mortality rates can be made specific for certain population characteristics such as age, sex, occupation or socio-economic status. Rates are standardized for such characteristics in order to removed the influence of factors such as age and sex, making comparable these rates calculated for different populations.

2. Standardized Mortality Rates. To standardize for the influence of age and sex on the death rate, a "standard" population is first selected. Then, age-specific mortality rates for the two groups being compared are applied to that age group population in the standard population. What one gets is, the number of deaths that can be expected in that standard population, had the age specific rates predominated (Lilienfeld and Lilienfeld 1980:77-78). These rates were calculated in this research for only one year (1931) comparing the Indians of Saskatchewan with the general Saskatchewan population, the calculations are provided in Appendix B. The standardized rates are available for this one year only, because the census information to calculate age-specific rates is not available for the Indians for other years.

3. Case-fatality Rate. This rate expresses the risk of dying for those with a specific disease, during a specified time period. This rate is usually expressed in terms of percentages. It is:

$$\frac{\text{Number of individuals dying during specified period of time after disease onset or diagnosis}}{\text{Number of individuals with the specific disease}} \times 100$$

(Lilienfeld and Lilienfeld 1980:74).

To express morbidity in a population, two types of rates can be calculated; incidence and prevalence. Incidence is a

measure of risk of developing a disease during a specified time period, prevalence measures the number of cases that are present at, or during, a specified time period.

Incidence Rate per 100,000	Number of New Cases of a disease occurring in a population in a specified time period
	<hr/> X 100,000
	Number of persons exposed to risk of developing the disease during that time period

Prevalence Rate per 100,000	Number of Cases (New and Old) of a disease present in a population at a specified time or during a specified time period
	<hr/> X 100,000
	Number of persons in the population at that time

(Lilienfeld and Lilienfeld 1980:137-139)

Where incidence and prevalence data are not available, hospital admissions, discharges or patient days are used as proxy measures to indicate the amount of illness in a population.

APPENDIX C:
STANDARDIZED MORTALITY RATE CALCULATION

STANDARDIZED TUBERCULOSIS DEATH RATES, 1931 SAS

INDIAN					MALES		WHITE				
AGE GROUP	MALE POP.	TB DEATH	RATE PER 100,000	STANDARD MILLION	TB DEATHS/ ST.MIL.		MALE POP.	TB DEATH	RATE PER 100,000	STANDARD MILLION	TB DEATHS/ ST.MIL.
0-4	1257	11	875.10	57039	499.15		52212	8	15.32	57039	8.74
5-9	1032	7	678.29	53462	362.63		55329	8	14.46	53462	7.73
10-14	928	7	754.31	51370	387.49		54678	6	10.97	51370	5.64
15-19	805	2	248.45	49420	122.78		50852	11	21.63	49420	10.69
20-24	624	5	801.28	45273	362.76		43343	21	48.45	45273	21.94
25-29	513	3	584.80	40835	238.80		37412	7	18.71	40835	7.64
30-34	456	3	657.89	35590	234.14		31261	12	38.39	35590	13.66
35-39	387	1	258.40	31803	82.18		32600	13	39.88	31803	12.68
40-44	306	0	0.00	27591	0.00		34368	13	37.83	27591	10.44
45-49	310	0	0.00	23394	0.00		32029	15	46.83	23394	10.96
50-54	203	0	0.00	19560	0.00		24189	2	8.27	19560	1.62
55-59	235	1	425.53	15295	65.09		15966	8	50.11	15295	7.66
60-64	170	0	0.00	12618	0.00		10656	4	37.54	12618	4.74
65-69	140	0	0.00	8682	0.00		7620	4	52.49	8682	4.56
70-74	124	0	0.00	6009	0.00		5383	1	18.58	6009	1.12
75-79	73	0	0.00	3477	0.00		2195	0	0.00	3477	0.00
80-85	30	0	0.00	1603	0.00		1099	0	0.00	1603	0.00
85+	39	0	0.00	552	0.00		483	0	0.00	552	0.00
TOTAL	7632	40	524.11	483543	2534.29		492175	133	27.02	483543	130.67

STANDARDIZED TUBERCULOSIS DEATH RATES, SASKATCHEWAN 1931

INDIAN					FEMALES		WHITE				
AGE GROUP	FEMALE POP.	TB DEATH	RATE PER 100,000	STANDARD MILLION	TB DEATHS/ ST.MIL.		FEMALE POP.	TB DEATH	RATE PER 100,000	STANDARD MILLION	TB DEATHS/ ST.MIL.
0-4	1306	12	918.81	57223	525.79		50451	8	15.86	57223	9.07
5-9	1141	4	350.57	53747	188.42		53707	6	11.17	53747	6.00
10-14	932	5	536.47	51365	275.56		53498	5	9.35	51365	4.80
15-19	790	1	126.53	50376	63.77		48586	15	30.87	50376	15.55
20-24	590	4	677.97	50673	343.55		37338	18	48.21	50673	24.43
25-29	539	3	556.53	45998	256.02		28995	9	31.04	45998	14.28
30-34	446	2	448.43	39156	175.59		25755	14	54.36	39156	21.28
35-39	377	0	0.00	34153	0.00		25959	10	38.52	34153	13.16
40-44	278	1	359.71	29302	105.40		23916	5	20.91	29302	6.13
45-49	235	0	0.00	25001	0.00		20501	7	34.14	25001	8.54
50-54	220	3	1363.64	21297	290.41		15428	5	32.41	21297	6.90
55-59	178	0	0.00	17064	0.00		9911	2	20.18	17064	3.44
60-64	168	0	0.00	14764	0.00		7219	2	27.70	14764	4.09
65-69	124	0	0.00	10676	0.00		5498	4	72.75	10676	7.77
70-74	146	2	1369.86	7713	105.66		3947	2	50.67	7713	3.91
75-79	77	0	0.00	4654	0.00		2084	1	47.98	4654	2.23
80-85	50	0	0.00	2356	0.00		917	1	109.05	2356	2.57
85+	39	0	0.00	959	0.00		443	0	0.00	959	0.00
TOTAL	7636	37	484.55	516457	2502.48		414153	114	27.53	516457	142.16

APPENDIX D:
INTERVIEW SCHEDULE

NAME:

RESIDENCE:

PATIENT INTERVIEW SCHEDULE

1. PERSONAL DATA
2. LIFE BEFORE ILLNESS/HOSPITALIZATION
3. LIFE AS A SANATORIUM PATIENT
4. LIFE AT HOME AGAIN

1. PERSONAL DATA

NAME _____ AGE _____

AGE WHILE AT SAN _____

MARITAL STATUS: CURRENT _____

AT TIME OF ILLNESS _____

RESIDENCE: CURRENT _____

PRIOR TO HOSPITALIZATION _____

NUMBER OF CHILDREN AND APPROXIMATE AGES AT TIME OF
ILLNESS _____

2.LIFE BEFORE ILLNESS/HOSPITALIZATION

GENERAL - WHAT WAS IT LIKE WHERE YOU LIVED? WHO DID YOU LIVE WITH? HOW MANY PEOPLE ? DID YOU HAVE LOTS OF FRIENDS?

WHAT DID YOU DO?

OCCUPATION, HOUSEWIFE, STUDENT?

WHAT DID THE OTHER PEOPLE YOU LIVED WITH DO? HUSBAND? FATHER?

HAD YOU ANY FRIENDS OR RELATIVES WHO HAD TB? DID ANY OF THEM GO TO THE SAN? DID YOU KNOW OTHER PEOPLE FROM THE RESERVE WHO WENT TO THE SAN OR HAD TB?

WHAT DID THEY TELL YOU ABOUT THEIR EXPERIENCE IN THE SAN?

DID DOCTORS AND NURSES OFTEN COME TO YOUR COMMUNITY TO DO CHECK - UPS, X-RAYS AND TESTS ON YOU AND YOUR FAMILY? DID THEY DO TESTS AT THE SCHOOLS?

WHEN YOU BECAME ILL:

WHAT WERE YOUR SYMPTOMS? DID YOU FEEL "ILL", OR DID SOMEONE TELL YOU THAT YOU WERE ILL? WHO DO YOU GO TO WHEN YOU ARE SICK? WHEN YOU BECAME ILL DID YOUR FAMILY OR FRIENDS SUGGEST THERAPIES? SUCH AS?

DID YOUR FAMILY AND FRIENDS TREAT YOU DIFFERENTLY WHEN THEY FOUND OUT YOU WERE ILL?

HOW?

DID ANYONE TALK YOU INTO GOING TO THE SAN? WHO?

WHAT ILLNESS DID YOU THINK YOU HAD? DID YOU RECOGNIZE IT AS TUBERCULOSIS? (EM) DID YOU KNOW WHAT TB WAS?

DID YOU GO TO A DOCTOR OR DID HE COME TO YOUR HOME AND TELL YOU THAT YOU WERE ILL AND NEEDED TO GO TO A SAN?

WHAT DID THE DOCTOR TELL YOU AND YOUR FAMILY ABOUT YOUR ILLNESS?(EM)

HOW DID YOU FEEL ABOUT BEING ILL? DID YOU UNDERSTAND WHY YOU HAD TO GO AWAY?

3.LIFE IN THE SANATORIUM

WHAT SAN/HOSPITAL DID YOU GO TO?

HOW DID YOU GET TO THE SAN? HOW DID YOU FEEL ON YOUR TRIP THERE? DID OTHERS FROM YOUR COMMUNITY TRAVEL THERE WITH YOU?

HOW LONG WERE YOU AT THE SAN? WERE THEY ABLE TO TELL YOU HOW LONG YOU WOULD HAVE TO STAY WHEN YOU ARRIVED?

WHEN YOU ARRIVED DID THEY EXPLAIN YOUR ILLNESS AND THE TREATMENT TO YOU? WHAT DID THEY TELL YOU? DID THIS FIT YOUR CONCEPTION OF YOUR ILLNESS?(EM)

CAN YOU DESCRIBE THE SAN FOR ME? WHAT WAS IT LIKE PHYSICALLY? WHERE DID YOU EAT/SLEEP? WHAT WERE THE ROOMS LIKE/ THE MEALS?

WHAT DID YOU DO WHILE YOU WERE THERE? DID THEY HAVE SOCIAL ACTIVITIES FOR YOU TO PARTICIPATE IN? DID THEY SEND YOU TO SCHOOL? WHAT WAS IT LIKE? DID THEY TEACH YOU ANY SKILLS, HOBBIES?

WHAT DID YOU DO ON HOLIDAYS? DID THEY HAVE SPECIAL CHRISTMAS OR EASTER PARTIES OR MEALS?

HOW WAS YOUR ILLNESS TREATED? DRUGS? TOTAL BED REST?

WERE THERE PEOPLE THAT YOU COULD TALK TO? WHAT WERE THE OTHER PATIENTS LIKE? WERE THEY FRIENDLY? DID THEY KEEP THE INDIAN PATIENTS SEPARATE FROM THE OTHERS THERE?

WAS IT A POSITIVE EXPERIENCE FOR YOU? HOW? OR, WAS IT A NEGATIVE EXPERIENCE? DID YOU FEEL LIKE A PRISONER THERE? WHY? HOW DID YOU FEEL?

DID ANYONE VISIT YOU AT THE SAN? WHO? HOW OFTEN?

DID YOU KNOW ANY OF THE OTHER PATIENTS? DID YOU MAKE MANY FRIENDS? DID YOU KEEP IN CONTACT WITH THEM AFTER YOU LEFT THE SAN?

A LIST OF THE GOOD AND BAD THINGS ABOUT BEING IN THE SAN - A SUMMARY

GOOD:

BAD:

WHAT WAS YOUR OVERALL IMPRESSION ABOUT LIFE IN THE SANATORIUM?

WHY DO YOU THINK THAT SO MANY OF THE SANATORIA PATIENTS WERE INDIANS?

4.LIFE WHEN YOU RETURNED HOME

WHAT DID YOU DO WHEN YOU RETURNED HOME? DID YOU RETURN TO YOUR OLD OCCUPATION? WERE YOU ABLE TO WORK? DID YOU HAVE ANY LONG TERM INCAPACITIES? DID YOU HAVE TO GO BACK FOR REGULAR CHECK-UPS?

DID THEY TELL YOU TO DO ANYTHING SPECIFIC WHEN YOU LEFT, SUCH AS CONTINUING REST PERIODS?

WERE YOU ABLE TO PUT TO USE ANY OF THE SKILLS THAT YOU LEARNED IN THE SAN?

DID YOU MARRY, AND HAVE KIDS?

DID YOU FEEL DIFFERENT, LIKE A DIFFERENT PERSON WHEN YOU GOT HOME? DID YOU FEEL THAT YOUR EXPERIENCE IN THE SAN CHANGED YOU? HOW? (VALUES AND ATTITUDES)

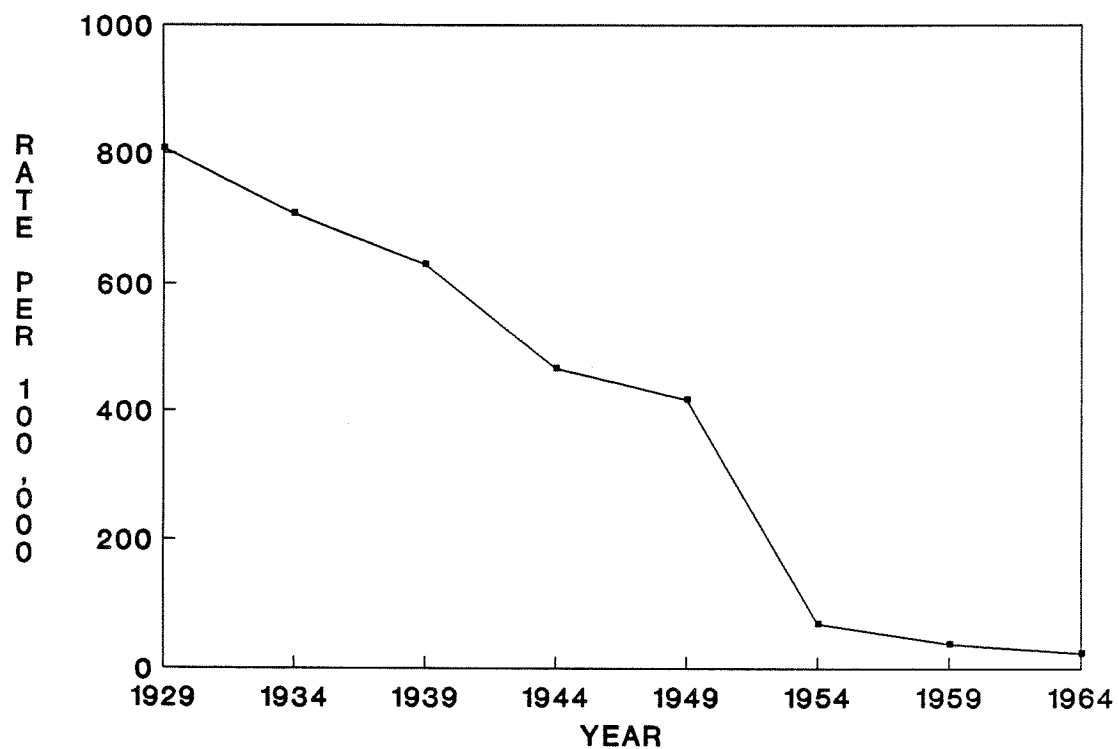
WERE THINGS AT HOME DIFFERENT WHEN YOU GOT BACK?
(PHYSICALLY, SOCIALLY)

HOW DID YOUR FAMILY AND FRIENDS REACT TO YOUR RETURN?

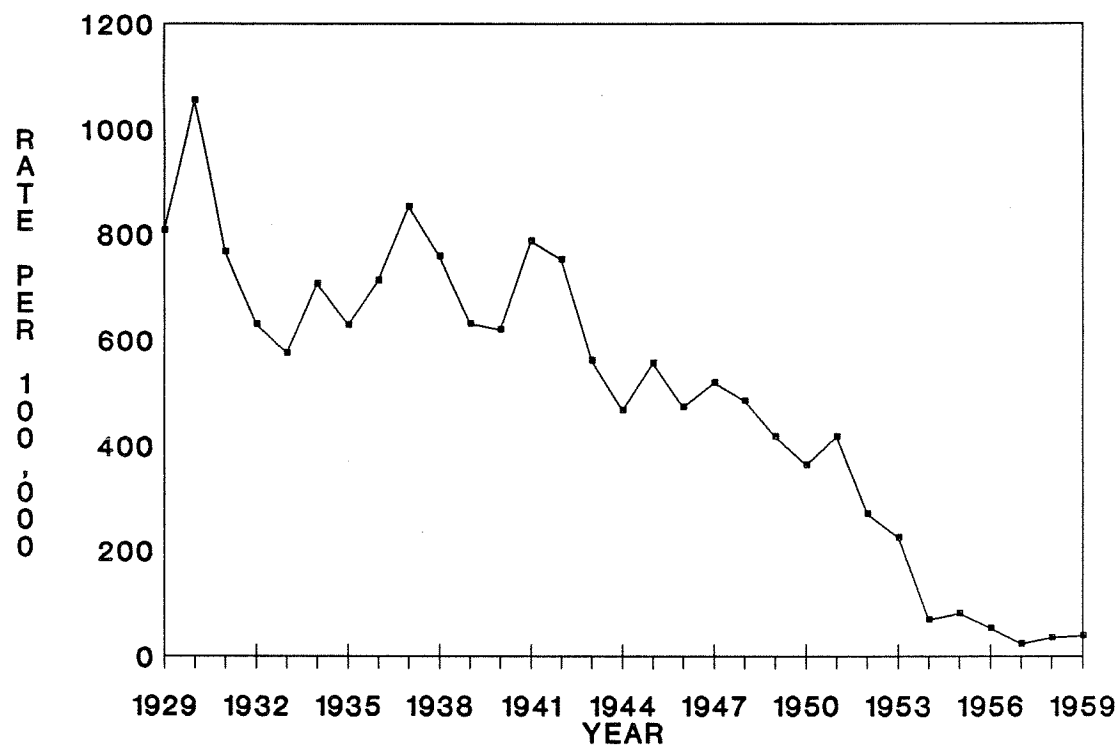
WOULD YOU SAY THAT YOU WERE ABLE TO JUST SLIDE BACK INTO THE GROOVE OF EVERYDAY LIFE? WHY DO YOU THINK YOU COULD OR COULDN'T?
DID YOUR FRIENDS TREAT YOU DIFFERENTLY? HOW?

WHAT ABOUT OTHER PEOPLE WHO CAME BACK FORM THE HOSPITALS, WERE THEY DIFFERENT, HOW?

APPENDIX E:
FIGURES 5.1 - 5.28



**Figure 5.1 Saskatchewan Indian Tuberculosis
Crude Mortality Rate, Census Years Only
1929- 1964**



**Figure 5.2 Saskatchewan Indian Tuberculosis
Crude Mortality Rate, All Years
1929 - 1959**

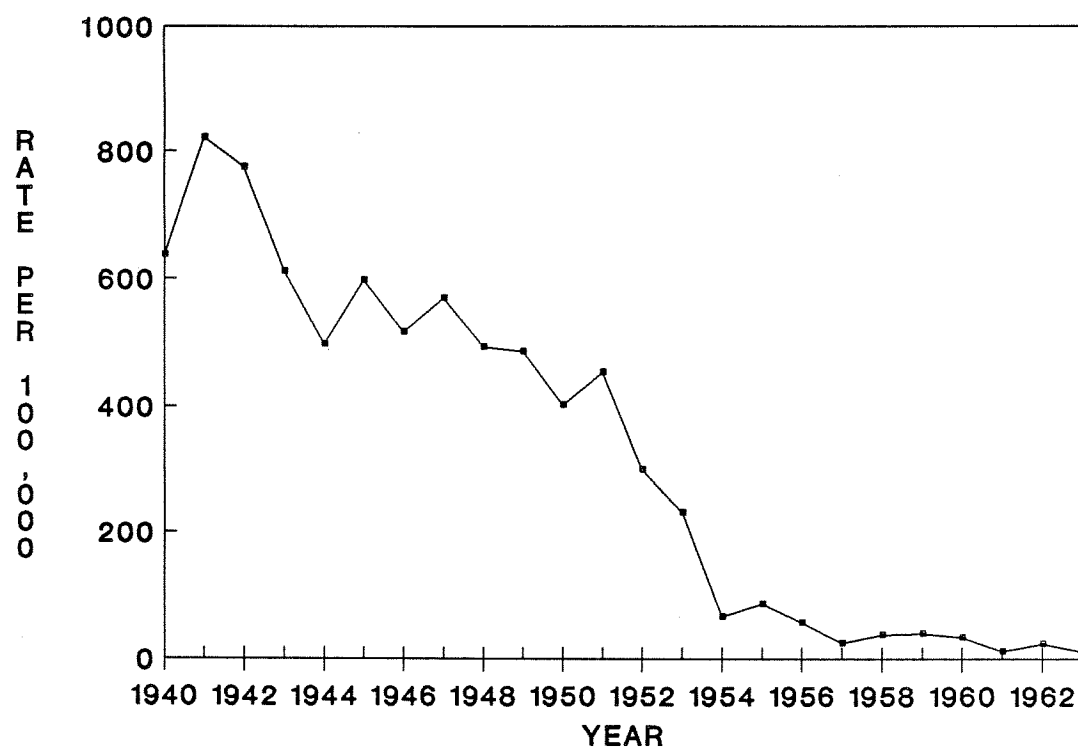


Figure 5.3 Saskatchewan Tuberculosis Crude Mortality Rate, Indians Only, 1940 - 1963
Fort San File Data

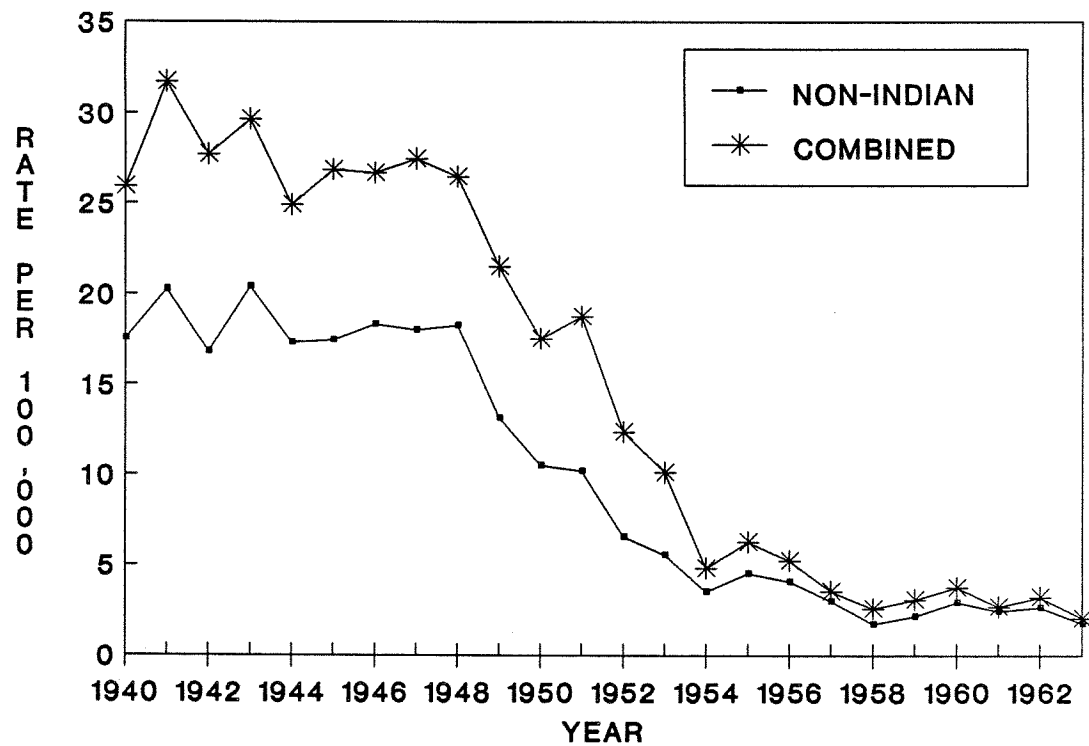


Figure 5.4 Saskatchewan Tuberculosis Crude Mortality Rate, Non-Indian and Combined Indian Non-Indian Rates, 1940 - 1963
Fort San File Data

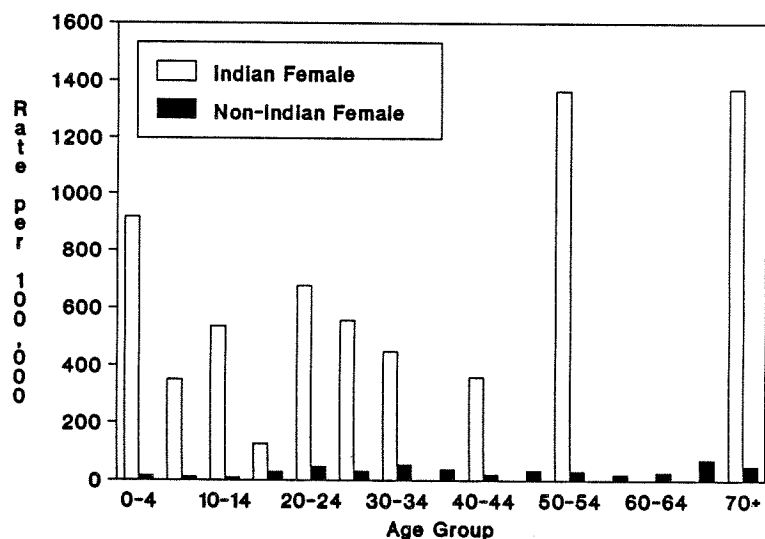
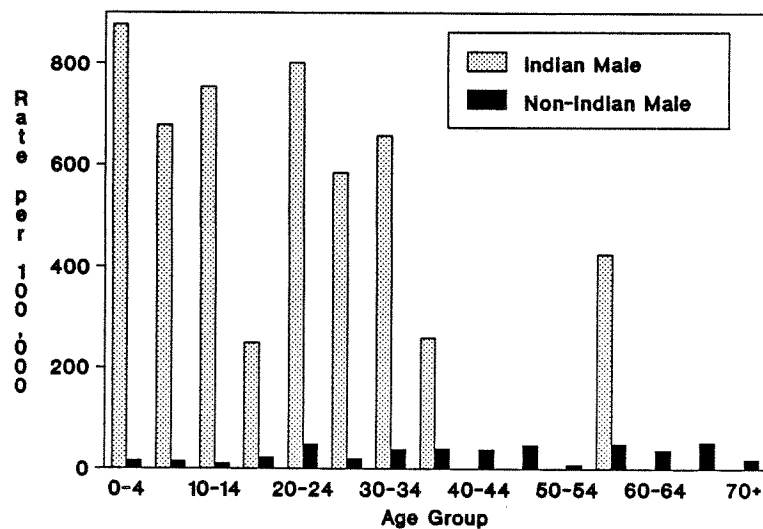


Figure 5.5a and 5.5b Crude Tuberculosis Death Rates, By Age Group and Sex
Saskatchewan 1931 Data From Fort San
File "Folder Not Labeled"

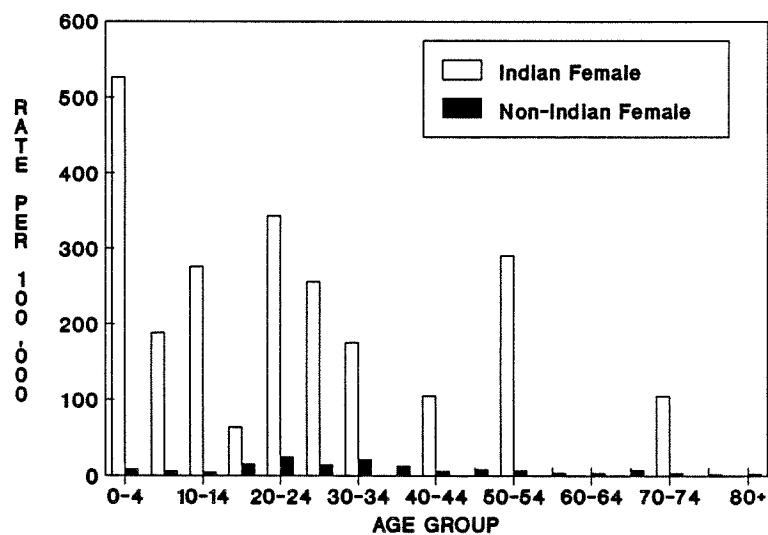
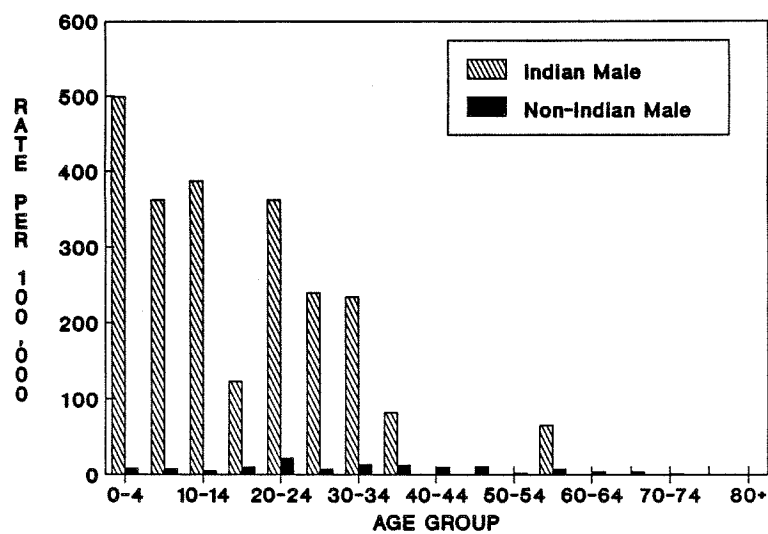


Figure 5.6a and 5.6b Standardized Tuberculosis Death Rates, By Age Group and Sex
Saskatchewan 1931 Data From Fort San
File "Folder Not Labeled"

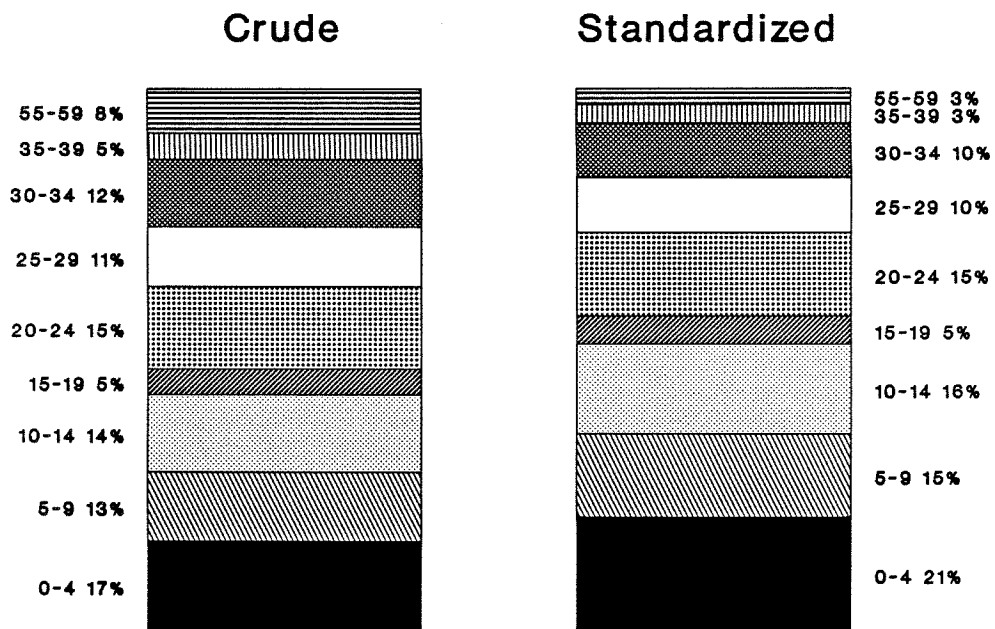


Figure 5.7 & 5.8 Saskatchewan Indian Males
Tuberculosis Death Rate, 1931, Percent
Contribution by Age Data From Fort San File
"Folder Not Labeled"

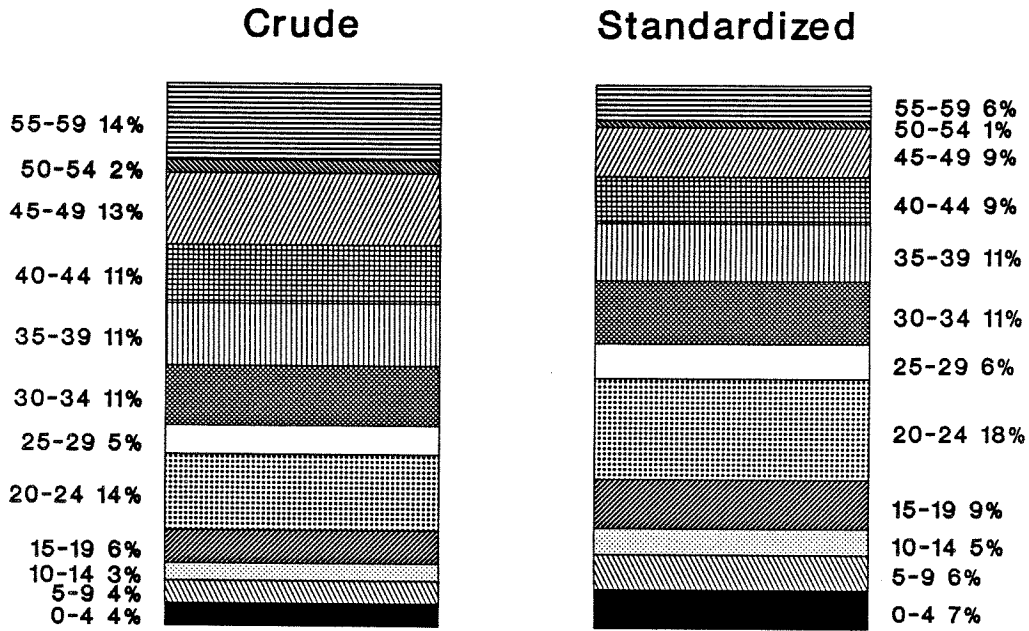


Figure 5.9 & 5.10 Saskatchewan Non-Indian Males, Tuberculosis Death Rate, 1931, Percent Contribution by Age Data From Fort San File "Folder Not Labeled"

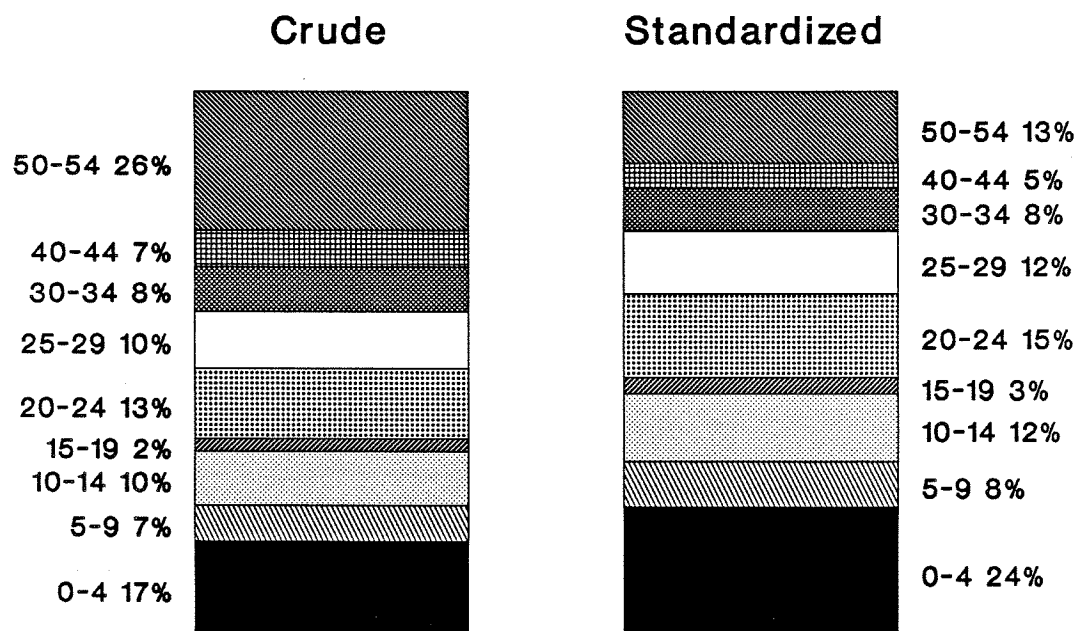


Figure 5.11 & 5.12 Saskatchewan Indian Females
Tuberculosis Death Rate, 1931, Percent
Contribution by Age Data From Fort San File
"Folder Not Labeled"

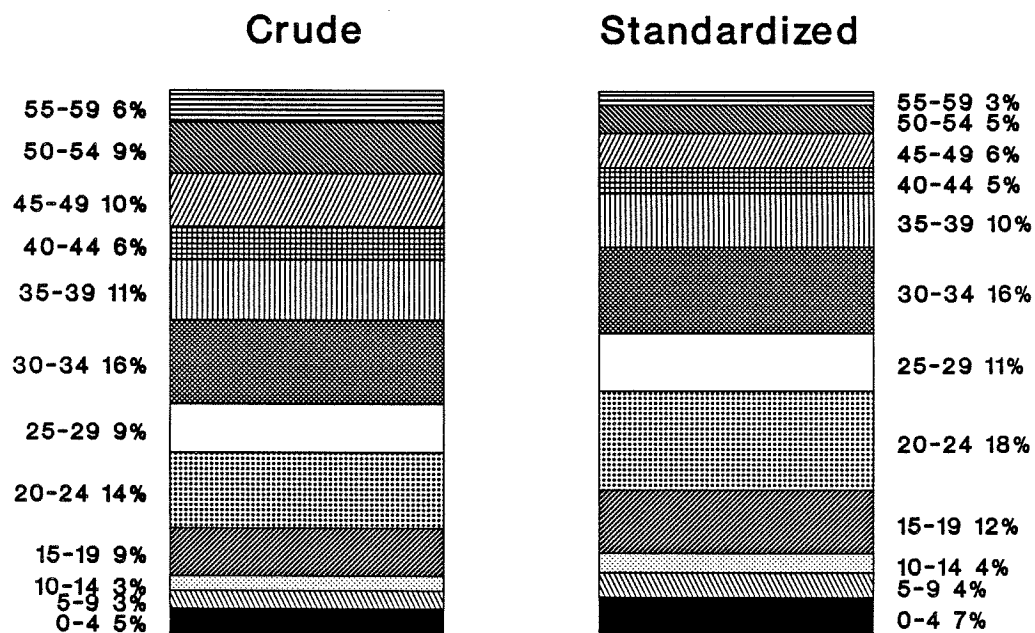


Figure 5.13 & 5.14 Saskatchewan Non-Indian Females, Tuberculosis Death Rate, 1931, Percent Contribution by Age Data From Fort San File "Folder Not Labeled"

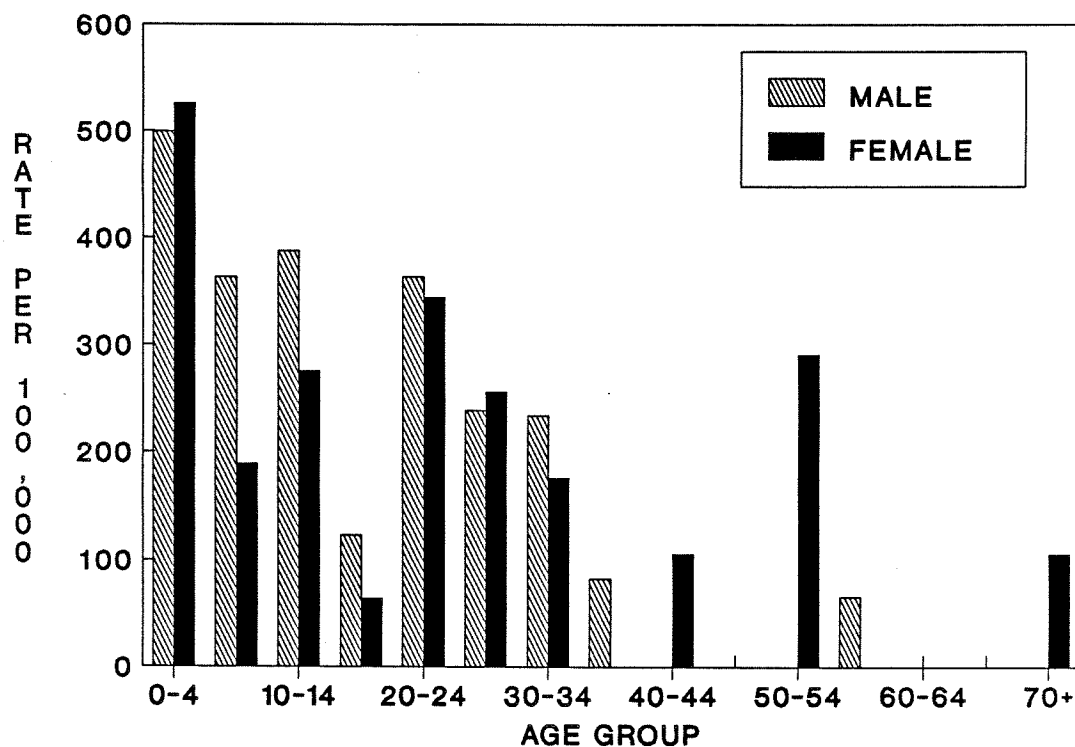
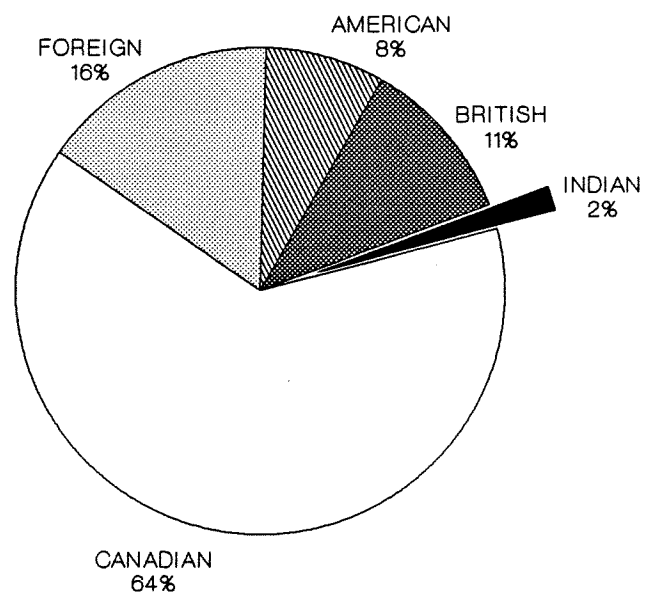
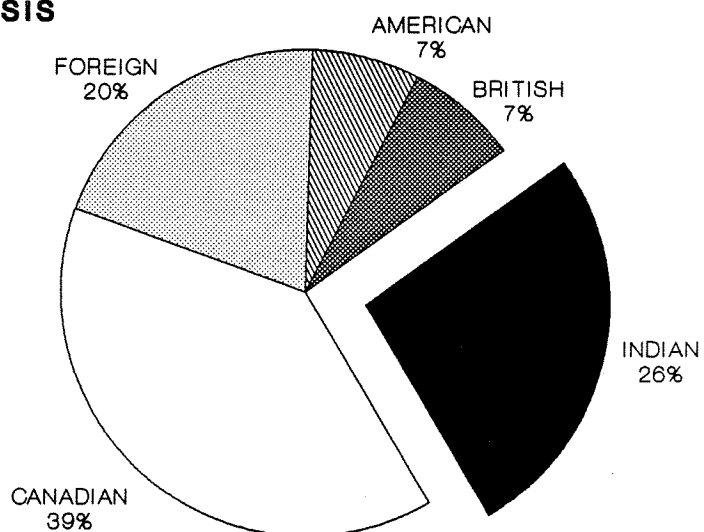


Figure 5.15 Standardized Tuberculosis Death Rates, By Age and Sex, Saskatchewan Indians, 1931 Data From Fort San File "Folder Not Labeled"

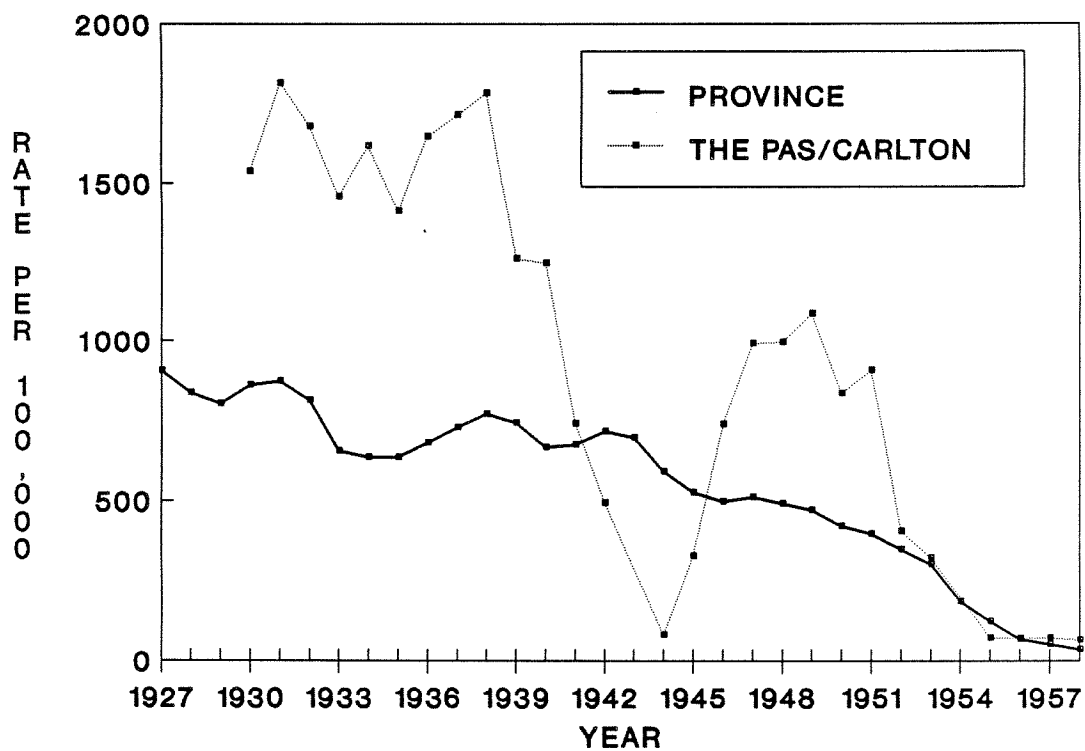
Population



Tuberculosis Deaths



**Figure 5.16 & 5.17 Percent Contribution to
Total Population and Tuberculosis Deaths
Saskatchewan 1931, By Racial Origin
Data From Fort San File "1931-1937 Statistics"**



**Figure 5.18 Indian Tuberculosis Death Rate
By Saskatchewan Agency, 1927 - 1958
3 Year Moving Average, The Pas/Carlton Agency,
Cumberland, Red Earth, and Shoal Lake Reserves**

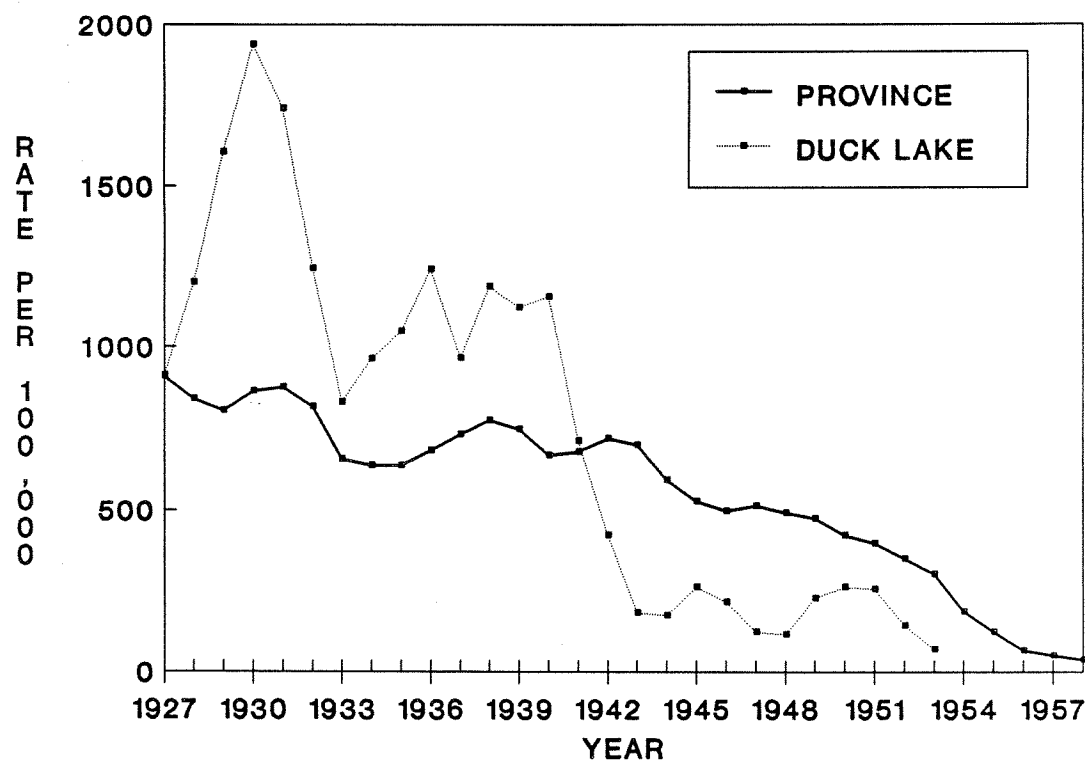


Figure 5.19 Indian Tuberculosis Death Rate By Saskatchewan Agency, 1927-1958, 3 Year Moving Average, Duck Lake Agency, James Smith, Muskoday, and One Arrow Reserves

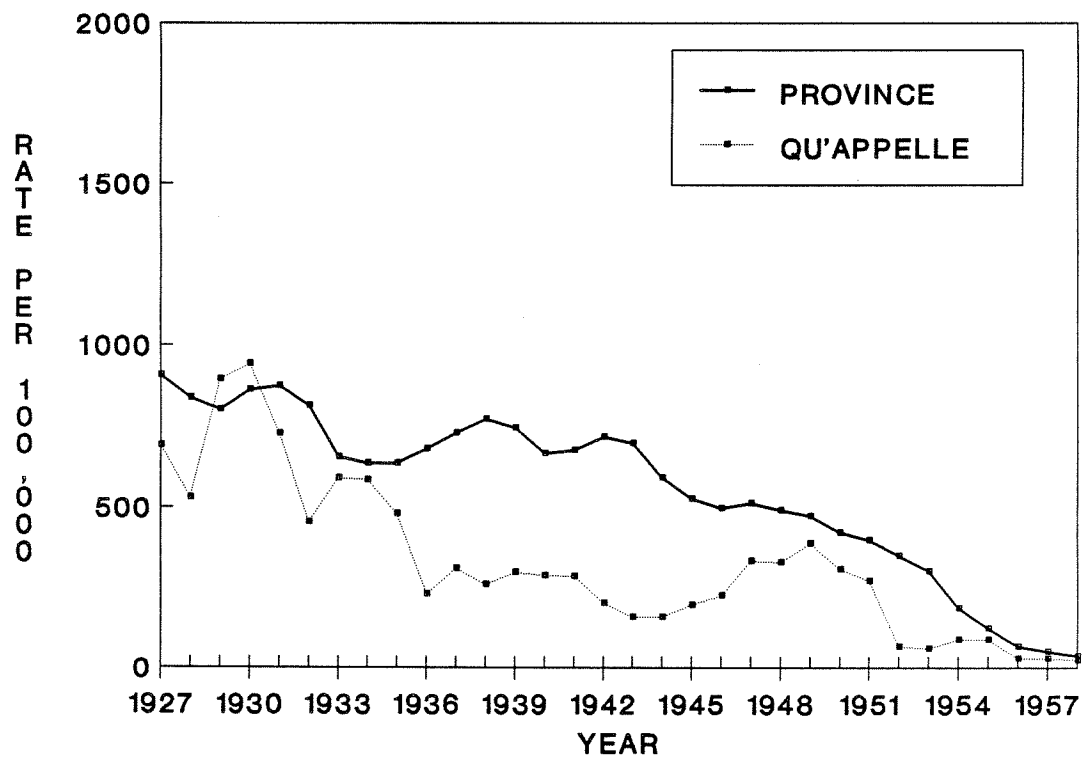


Figure 5.20 Indian Tuberculosis Death Rate By Saskatchewan Agency, 1927-1958, 3 Year Moving Average, Qu'Appelle Agency, Pasqua, Muscowpetung, Piapot and Standing Buffalo Reserves

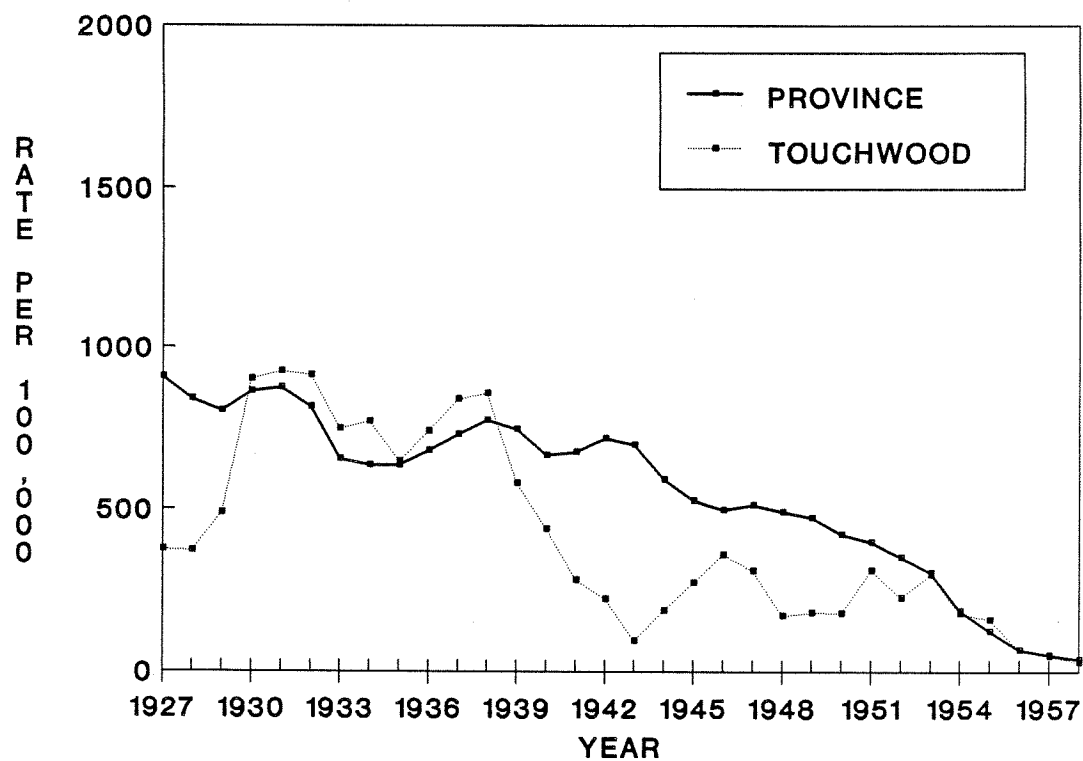


Figure 5.21 Indian Tuberculosis Death Rate By Saskatchewan Agency 1927-1958, 3 Year Moving Average, Touchwood Agency, Daystar, Fishing Lake, Muskowekwan, Nutlake, Poorman and Gordon Reserves

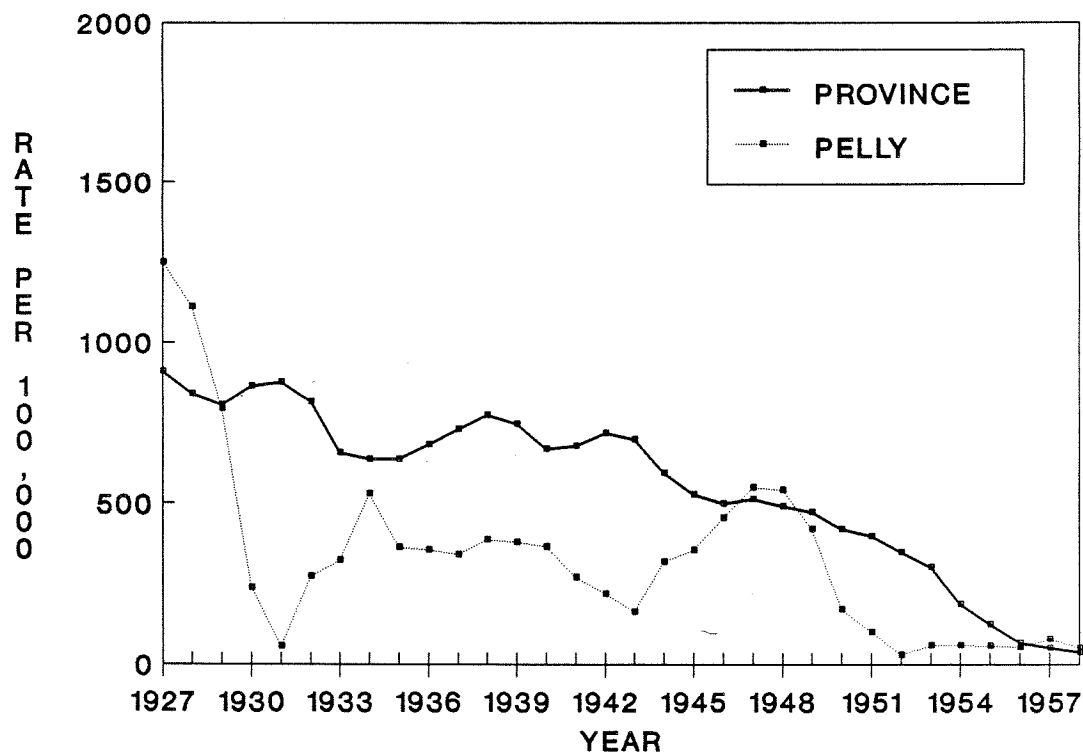


Figure 5.22 Indian Tuberculosis Death Rate By Saskatchewan Agency 1927-1958, 3 Year Moving Average, Pelly Agency, Cote, Key and Keeseekoose Reserves

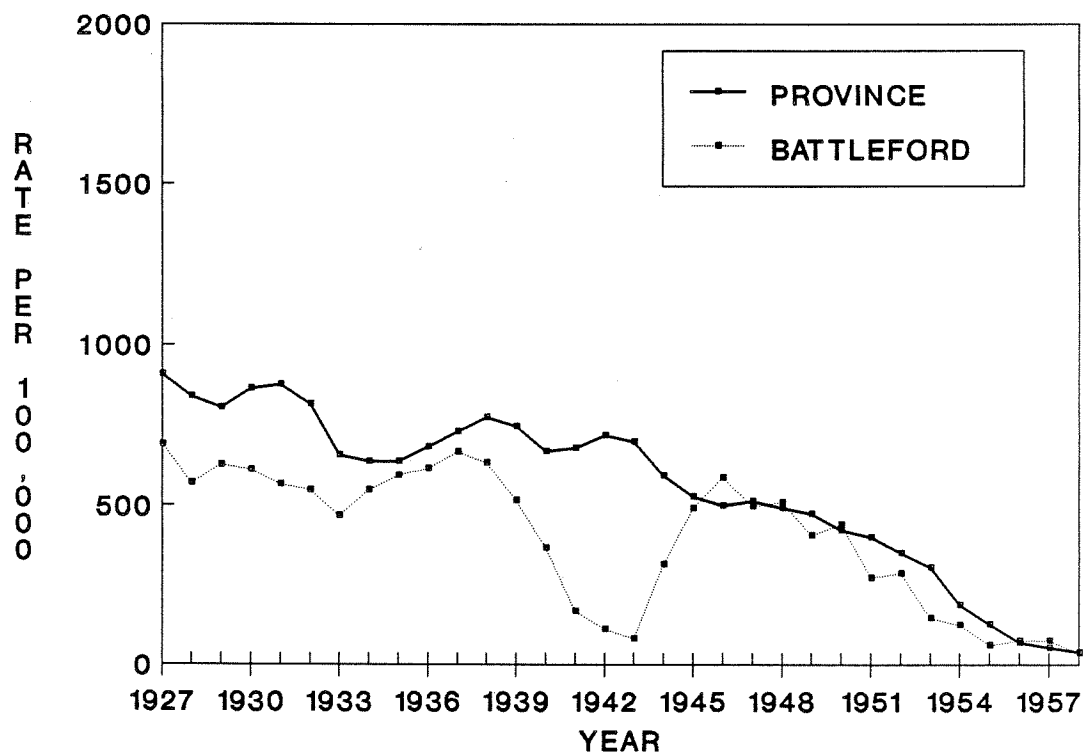


Figure 5.23 Indian Tuberculosis Death Rate By Saskatchewan Agency 1927-1958, 3 Year Moving Average, Battleford Agency, Littlepine, Moosomin, Poundmaker, Red Pheasant, Sweetgrass, and Thunderchild Reserves

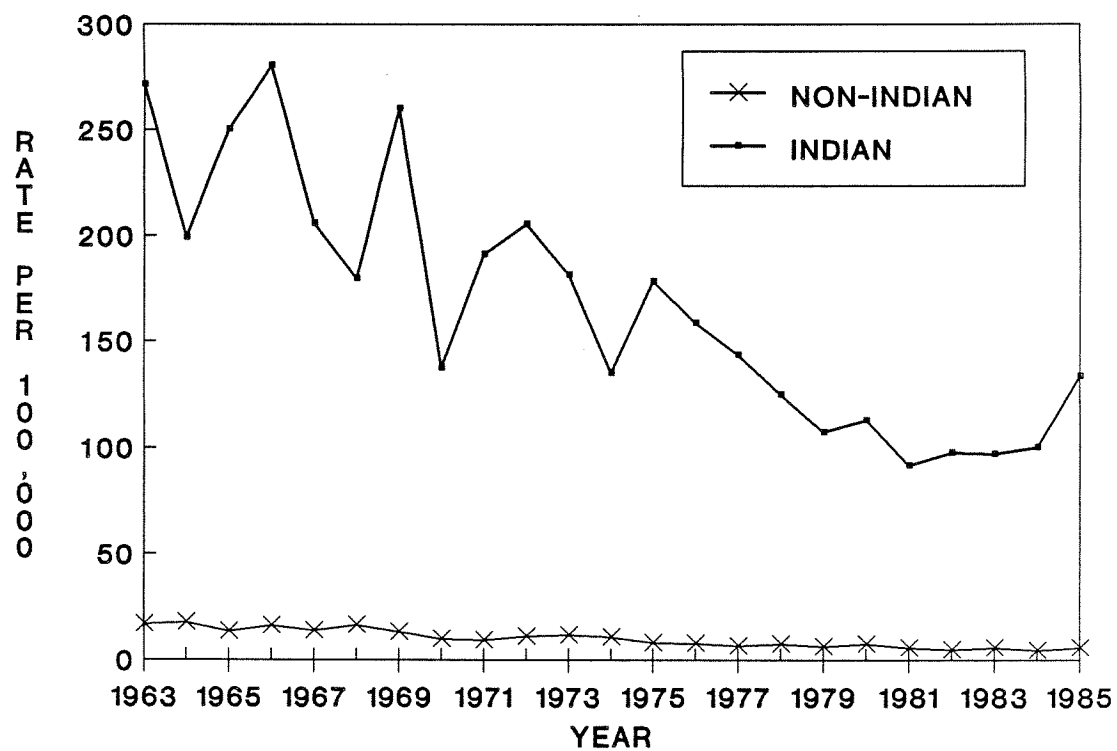
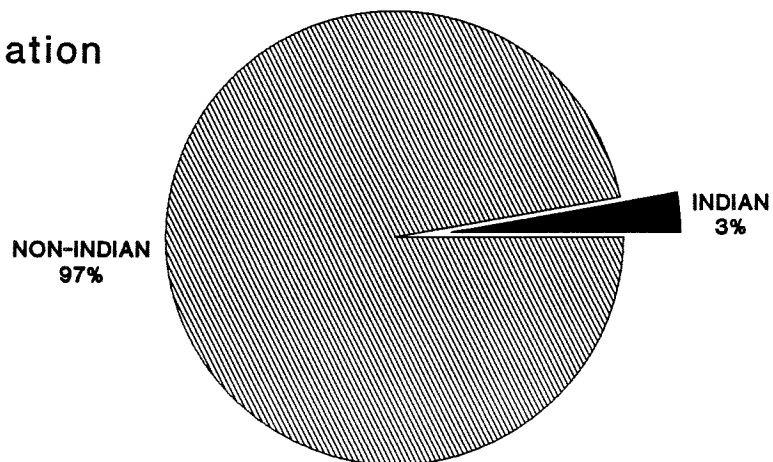


Figure 5.24 New Cases of Tuberculosis in Saskatchewan 1963 - 1985, Data from Fort San File "Tb Deaths 1901-1986"; and Personal Correspondence from Dr. G.D. Barnett

Population



Tuberculosis New Cases

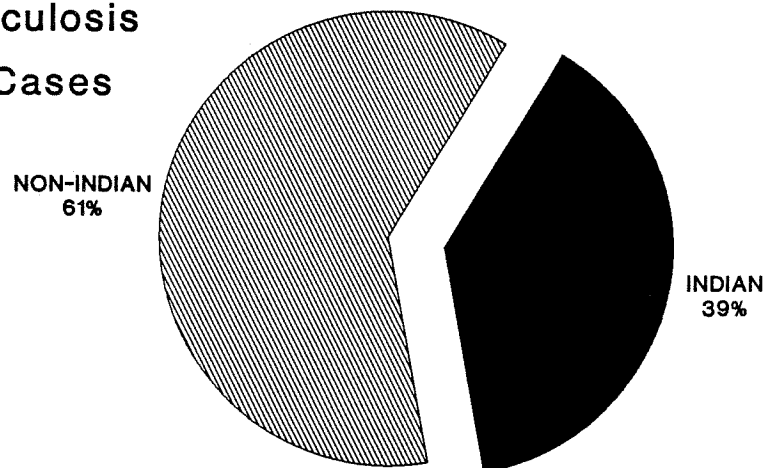
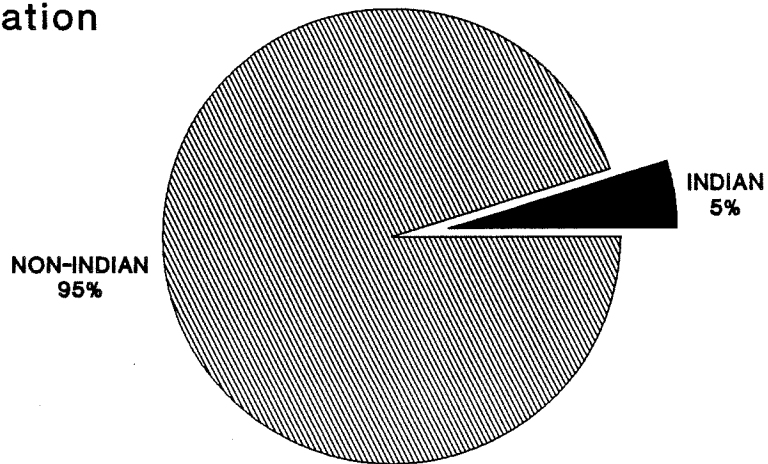
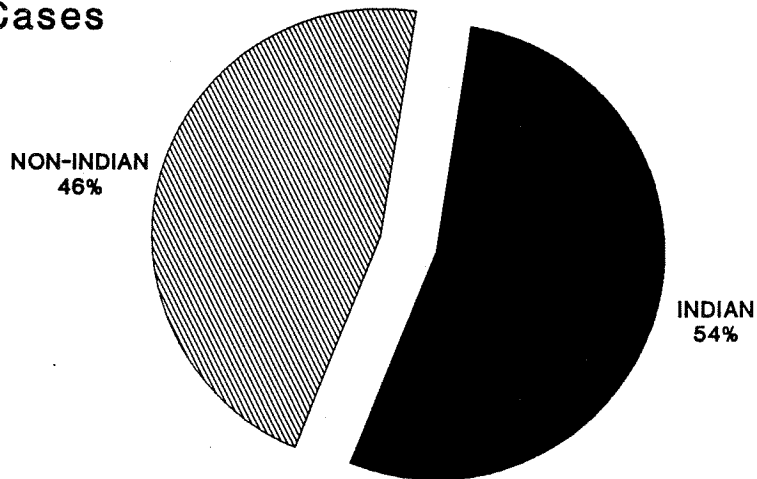


Figure 5.25 & 5.26 Percent Contribution to Total Population and New Cases of Tuberculosis Saskatchewan 1963, Data from Fort San File "Tb Deaths 1901-1986"; and Personal Correspondence from Dr. G.D. Barnett

Population



Tuberculosis New Cases



**Figure 5.27 & 5.28 Percent Contribution to
Total Population and New Cases of Tuberculosis
Saskatchewan 1985, Data from Fort San File
"Tb Deaths 1901-1986"; and Personal
Correspondence from Dr. G.D. Barnett**

APPENDIX F:
*CIRCULAR - "Special Precautions Against
the Spread of Consumption"*

Department of Indian Affairs

Ottawa,.....**APR 5 1924**.....192.....

SIR,—

I have the honour to direct your attention to the following precautionary sanitary measures and to inform you that it will be your imperative duty not only to explain them to the Indians under your charge, but to impress upon them the necessity for their observance and as far as possible insist upon their being carried into effect.

I. Vaccination

The early vaccination of all infants and adults who may not previously have been successfully operated on, and their revaccination within seven years after the last successful operation. Lists of those successfully operated upon should be sent to the Department.

II. Removal of Garbage, etc.

The removal (and burning if such can be safely done) of all refuse matter and filth calculated to engender disease from under and around the dwellings and from the premises occupied by the Indians; also the prevention of their accumulation in the vicinity of or entrance into wells, springs, or other sources from which water for drinking or cooking purposes is obtained, or milking cows are watered.

III. Construction of Dwellings

Every effort should be made to induce Indians to build their houses on high dry ground and with gable roofs and otherwise of dimensions to provide sufficient breathing space for the number of inmates, also with windows enough to insure the admission of plenty of sunlight and fresh air.

IV. Atmospheric and Other Conditions

Houses should be kept at a moderate temperature, well ventilated night and day by the opening of windows or other means, frequently scrubbed, swept and dusted so as to be free from dirt and dust. Disinfectants should be used when necessary and whitewash liberally applied both to dwellings and outbuildings.

V. Care of the Person

Indians should be encouraged in the preservation of cleanliness by the practice of personal ablutions, and the washing and airing of their clothes, bedding, etc., also to provide themselves and their children with warm clothing during the fall, winter and spring, and to avoid, more especially when recovering from sickness, going from a warmer to a colder atmosphere when insufficiently clad, and going about with their feet wet, more particularly in the spring when the snow is melting.

VI. Food

The consumption of bad meat, of milk from sick cows, and of water from polluted sources should be strictly avoided. The use of vegetables should be encouraged, and care taken with regard to the proper cooking of bread and other food.

VII. Special Precautions against the Spread of Consumption

Consumption in its various forms is the scourge of the Indians, and while the strict observance of the general precautions hereinabove enjoined is always necessary, it is absolutely essential where consumption is present, and will go far to cure it when in its early and still curable stage.

Since, however, the disease is highly contagious, the following additional measures for the prevention of its spread, should be strictly practised.

As the sputa of those affected and the pus and matter of discharging scrofulous sores contain and transmit the *tubercle bacilli*, expectoration on the floors of the houses should never be allowed, but some receptacle should be used for the purpose, the contents of which should be burnt and the receptacle disinfected, and all scrofulous sores should be cleanly dressed and the soiled dressing destroyed.

The unnecessary frequenting of and more especially holding of gatherings for dancing or other purposes in houses in which there is consumption should be carefully avoided. Any house in which a death from consumption may occur should be well cleaned out, aired and whitewashed inside.

You should report fully to the Department not later than 30th April what action has been taken by you to carry out the instructions contained in this circular.

J. D. McLEAN,

Assistant Deputy and Secretary.

